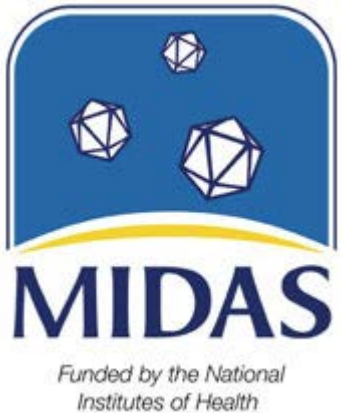


Visual Portfolio Analyses

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Background



MIDAS (Models of Infectious Disease Agent Study) is a **collaborative network of research scientists** who use computational, statistical, and mathematical models to understand infectious disease dynamics and thereby assist the nation to prepare for, detect, and respond to infectious disease threats.

Background

MIDAS consortium currently consists of

- 2 Centers of Excellence (U54)
- 7 Research Grants (U01)
- 1 Information Resource (U24)

Research question

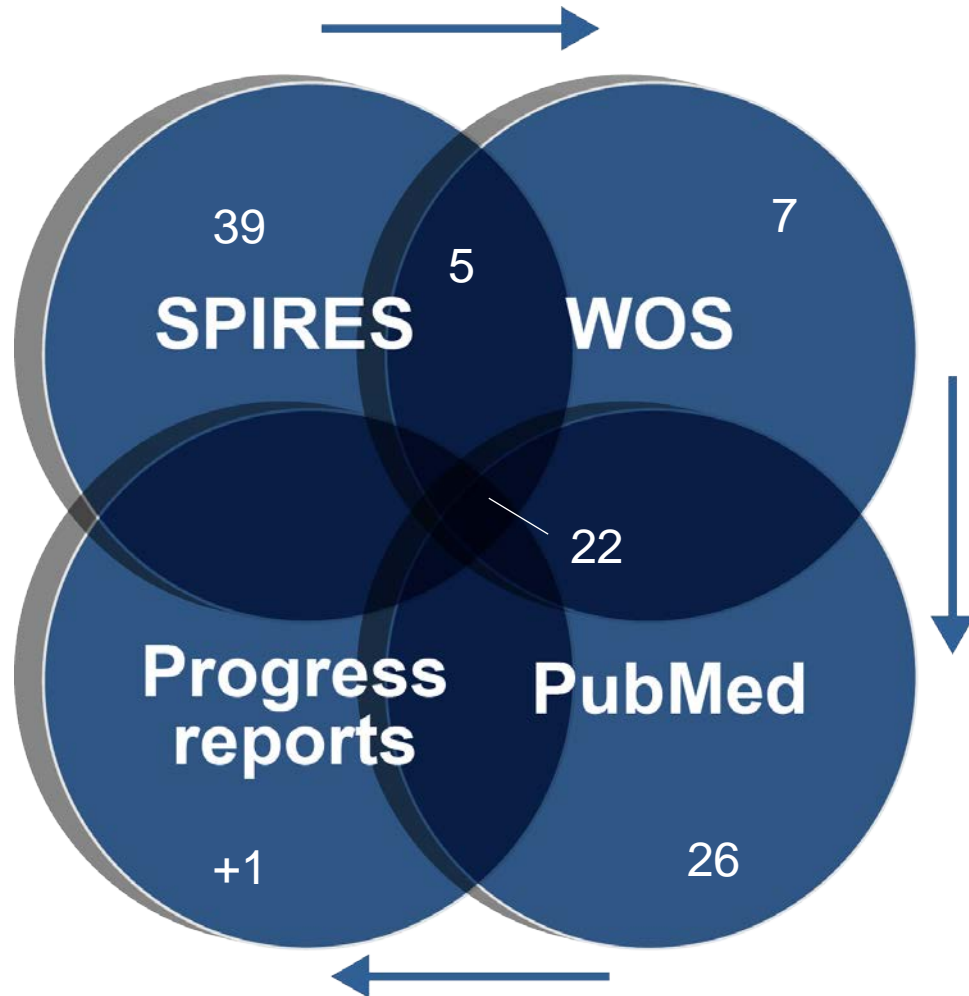
**“Has the MIDAS program stimulated
a collaborative and productive
network of researchers?”**

Methods



From 2005 to May 7, 2014,
648 peer-reviewed publications
cited funding from one of the
16 MIDAS grants.

Methods: example 1

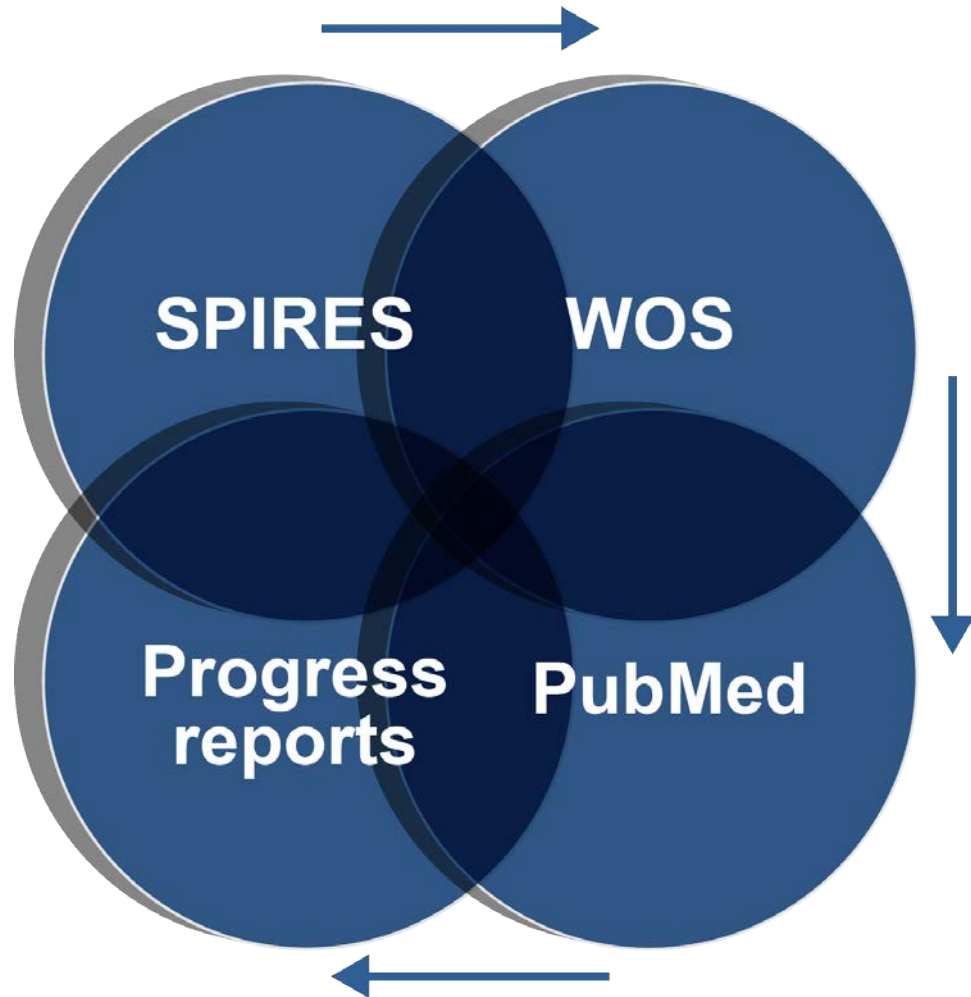


PI: Eubank (U01)

Publications: 46

SPIRES was a better source.

Methods: example 2



PI: Burke (U54)
Publications: 196

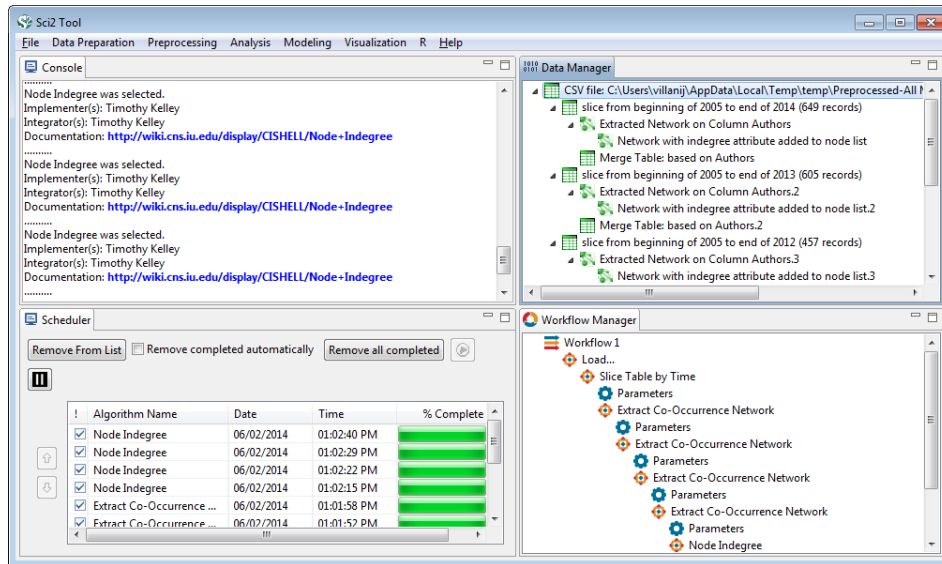
PubMed was a better source.

Data cleaning

	A	B	C	
1	Cummings, Derek A T			
2	Cummings, Derek			
3	Cummings, DAT			
4	Cummings, D			
5				
6	Atkins, Karla E			
7	Atkins, Katherine			
8	Atkins, KE			
9				
10	Kleinman, K P			
11	Kleinman, Ken			
12	Kleinman, Ken P			
13	Kleinman, Kenneth P			
14				
15	Li, M			
16	Li, Meng			
17	Li, Ming			
18				

- Formatting
- Name disambiguation

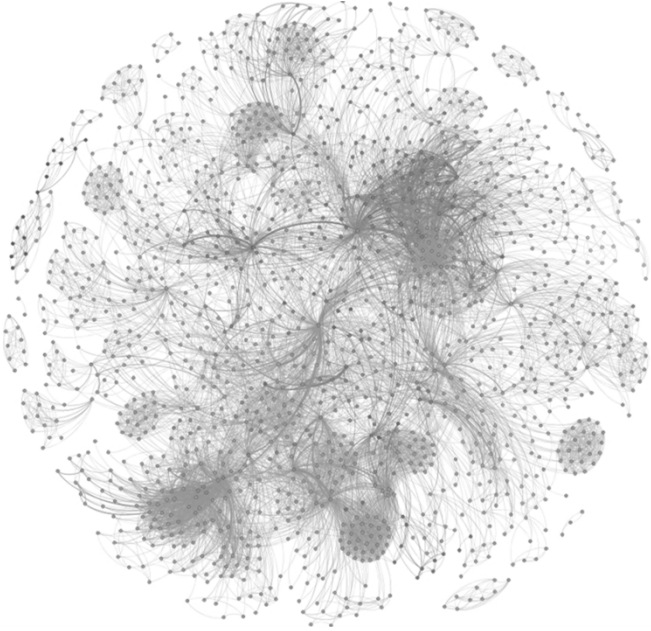
Methods



Sci2

- Used to extract the coauthor network.
- Data separated by year to see how the network evolved over time.

Methods



Gephi

- Used to create the visualization for the coauthor network.
- The Force Atlas algorithm was used to fan out the nodes with fewer edges. Then the Fruchterman-Reingold algorithm was used to shape the network more elegantly.

Methods



IN-SPIRE

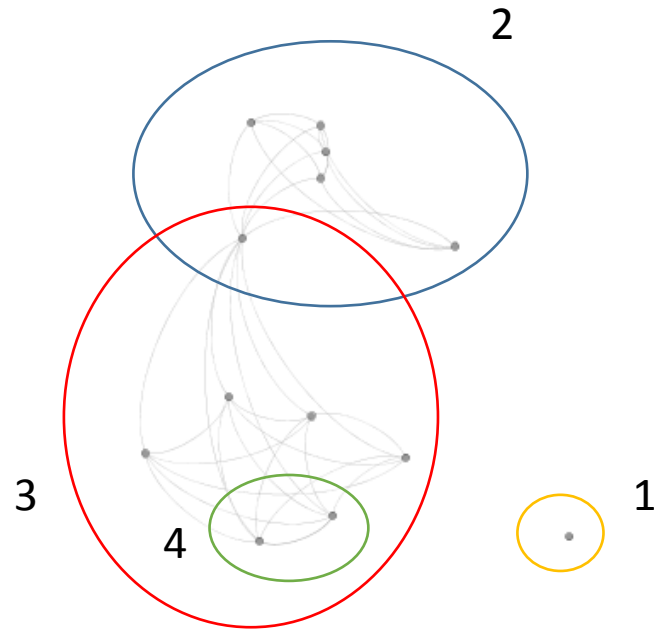
- Used to visualize the proportional productivity of each grant over time.

Results

Year	Nodes	Edges	Publications
2005	13	36	4
2006	33	69	11
2007	68	179	33
2008	138	636	56
2009	302	1,874	116
2010	474	3,247	196
2011	739	6,062	310
2012	1,093	8,418	456
2013	1,454	11,565	604
2014	1,576	12,592	648

Visualizing the collaborations

2005



In 2005, there were 13 nodes and 36 edges for four publications.

2006



Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.

2007



Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.

2008



Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.

2009



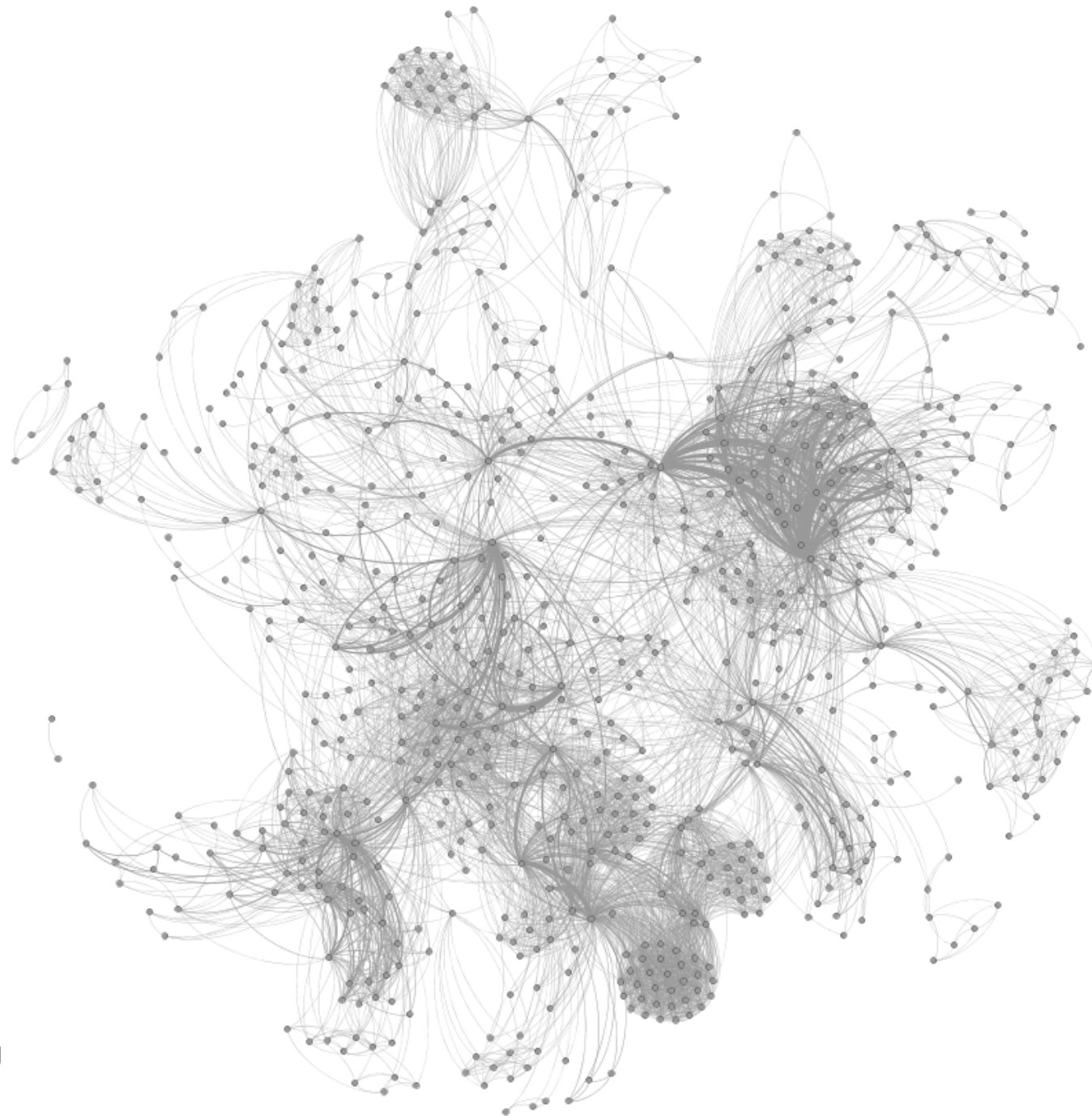
Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.

2010



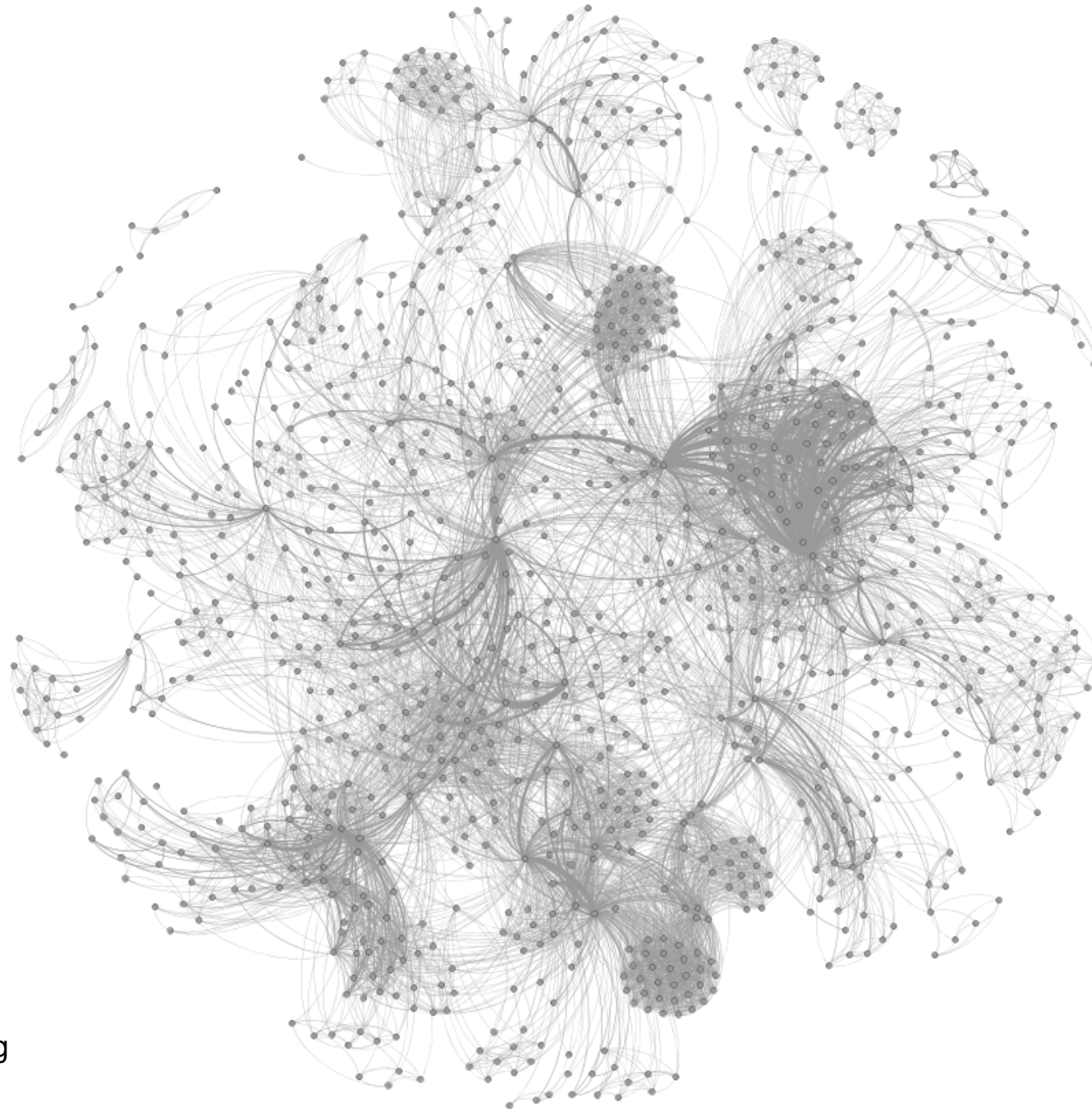
Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.

2011



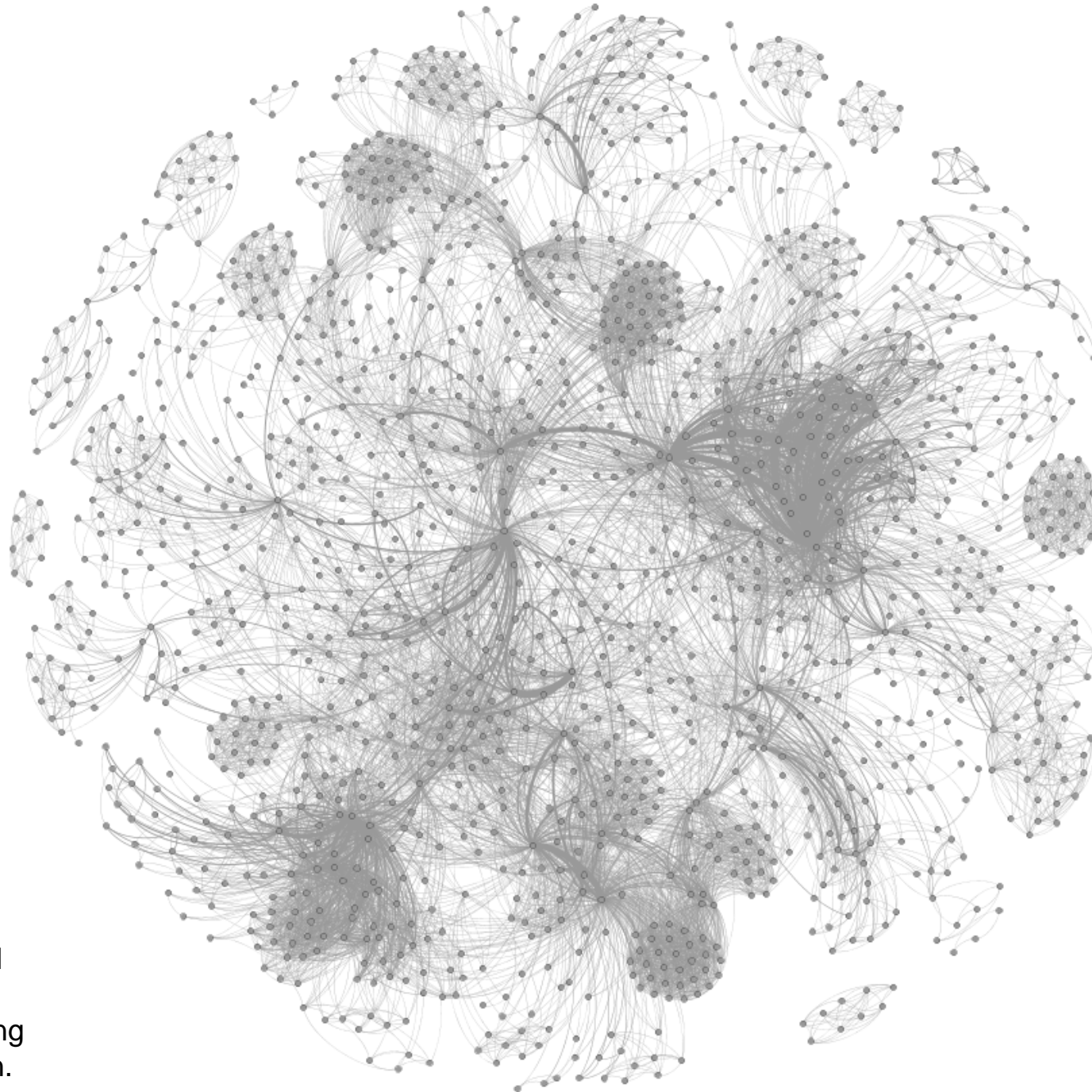
Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.

2012



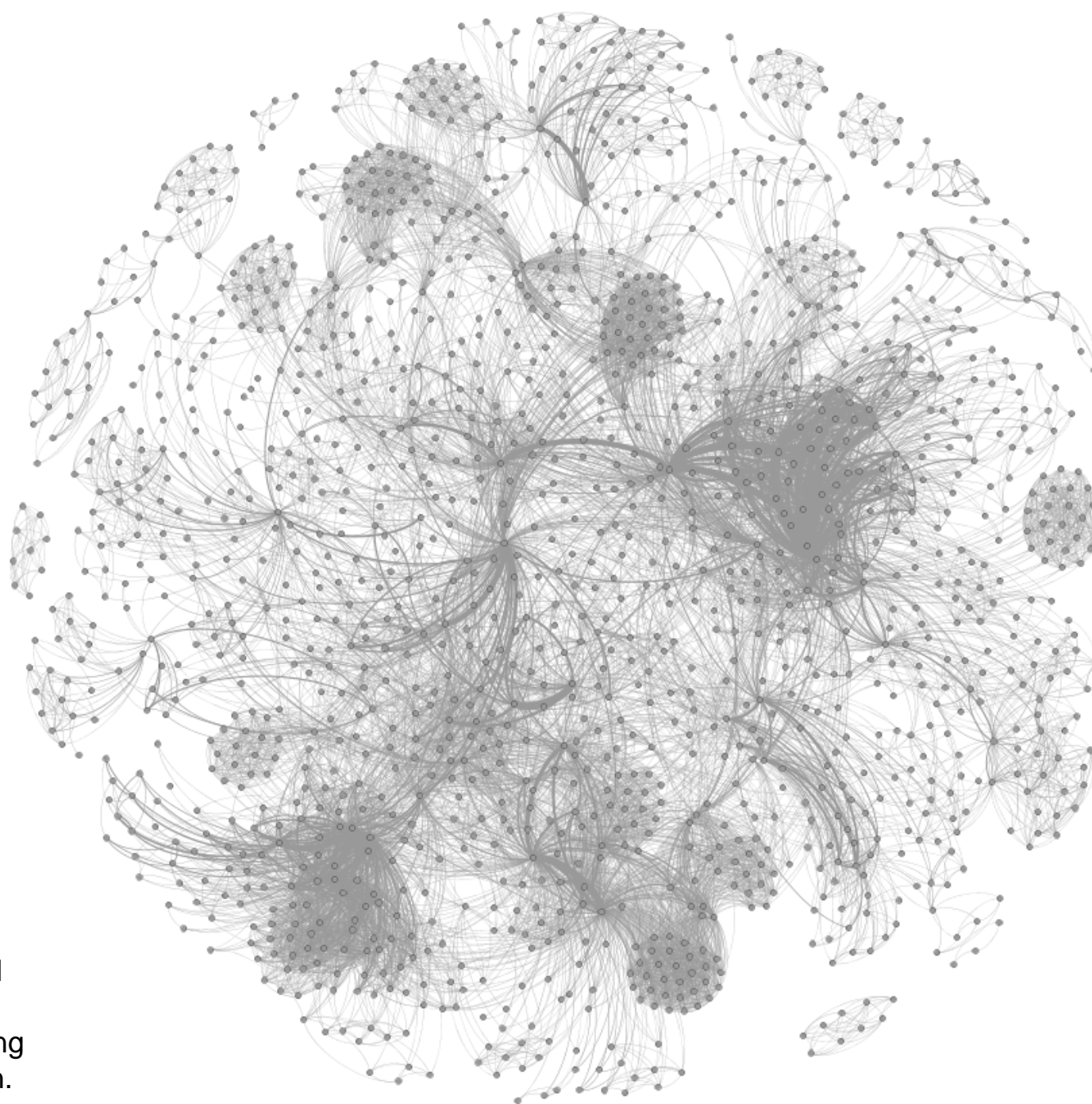
Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.

2013



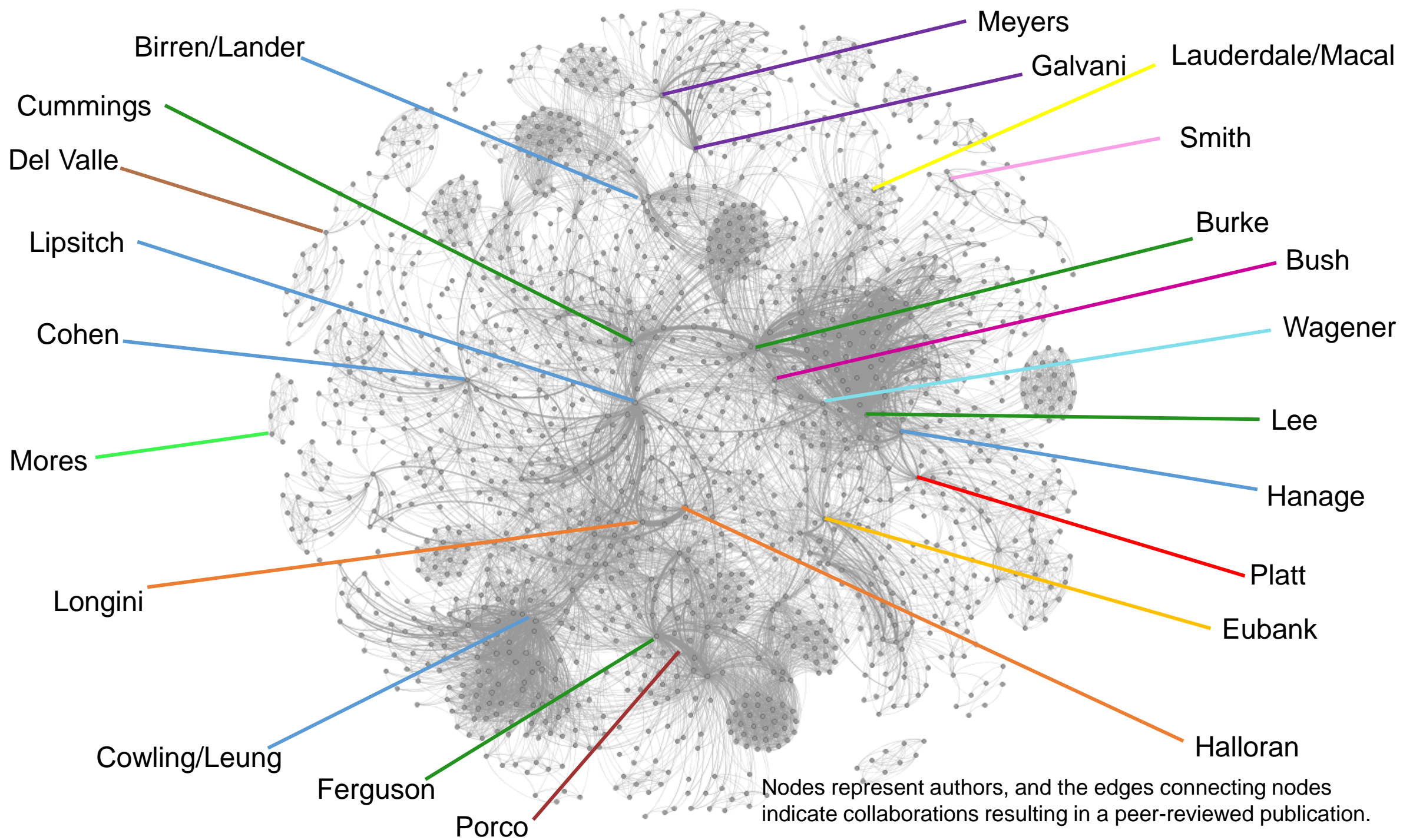
Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.

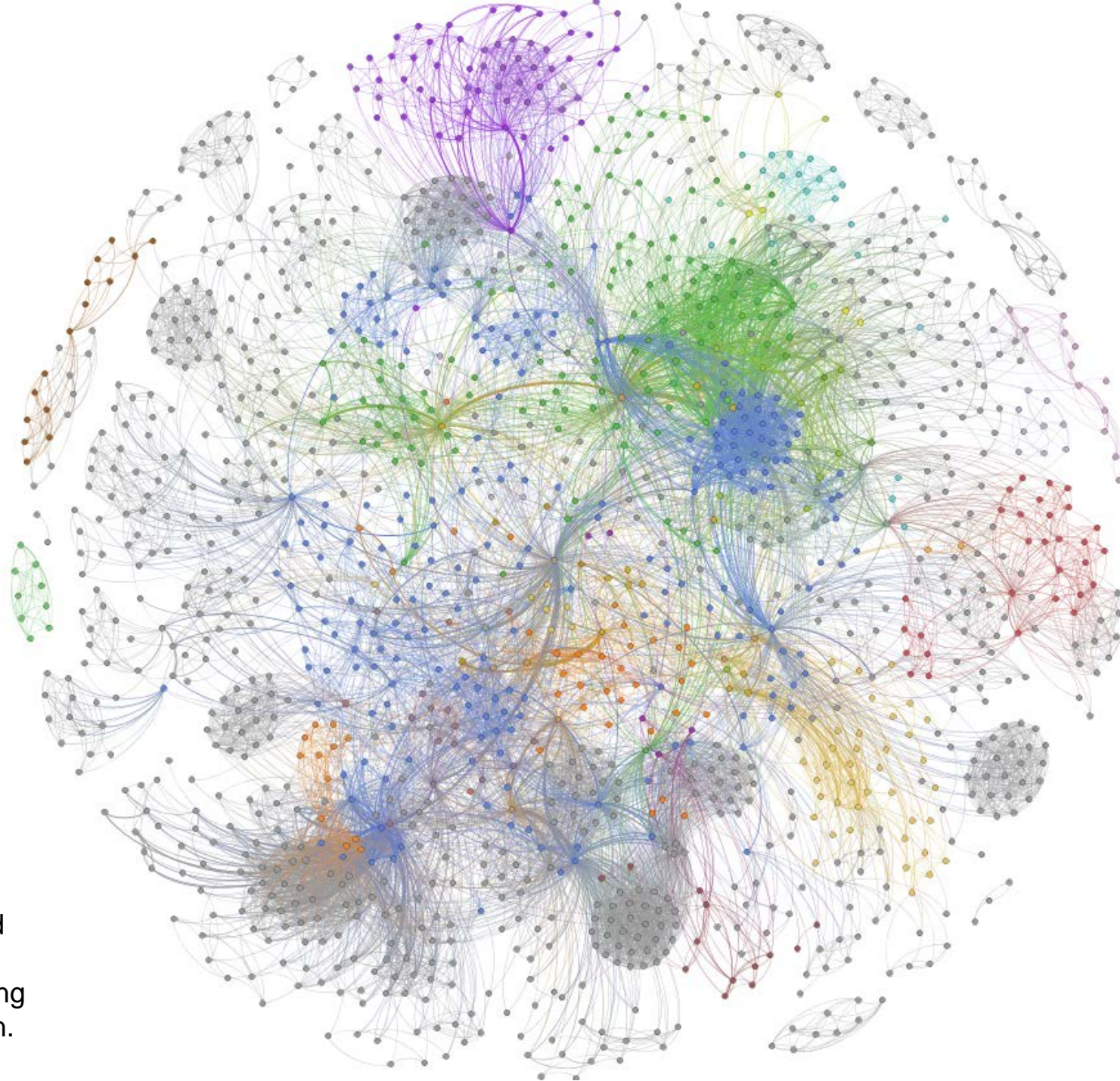
2014



Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.

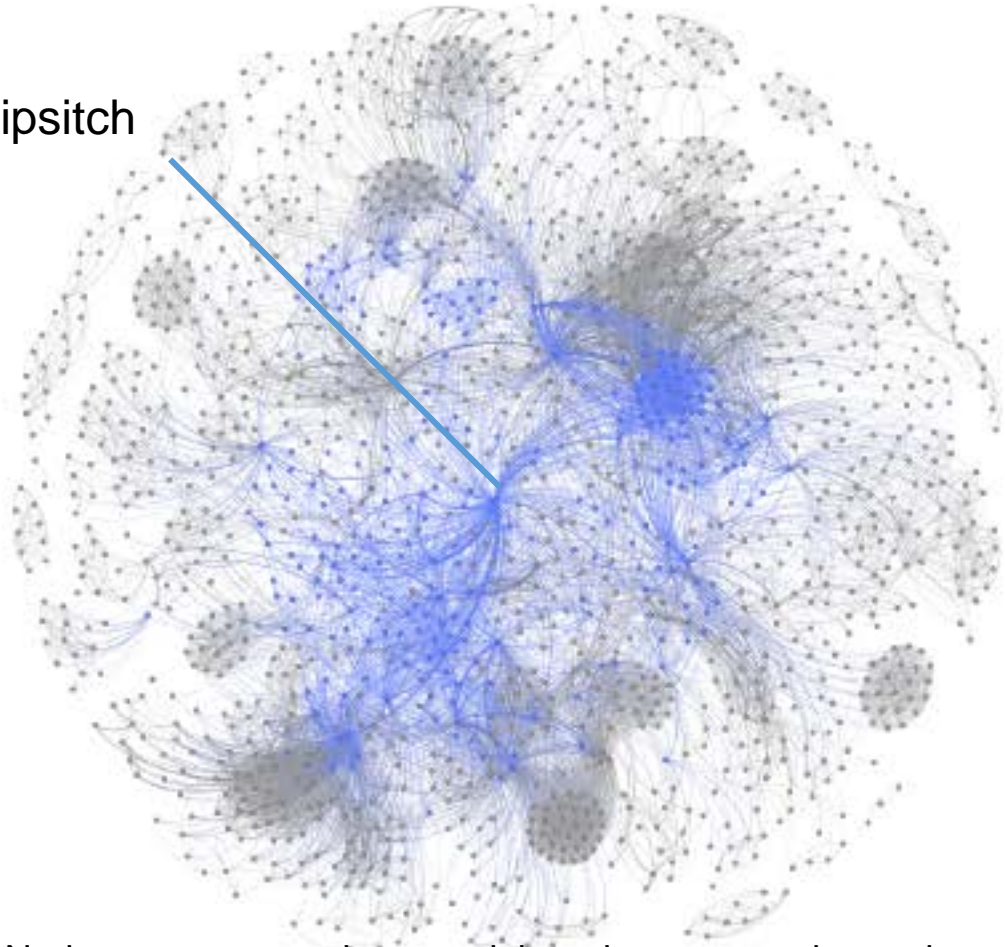
The least collaborative PI (Mores) coauthored two publications and had eight coauthors, whereas the most prolific PI (Lipsitch) had 81 publications with 258 coauthors.



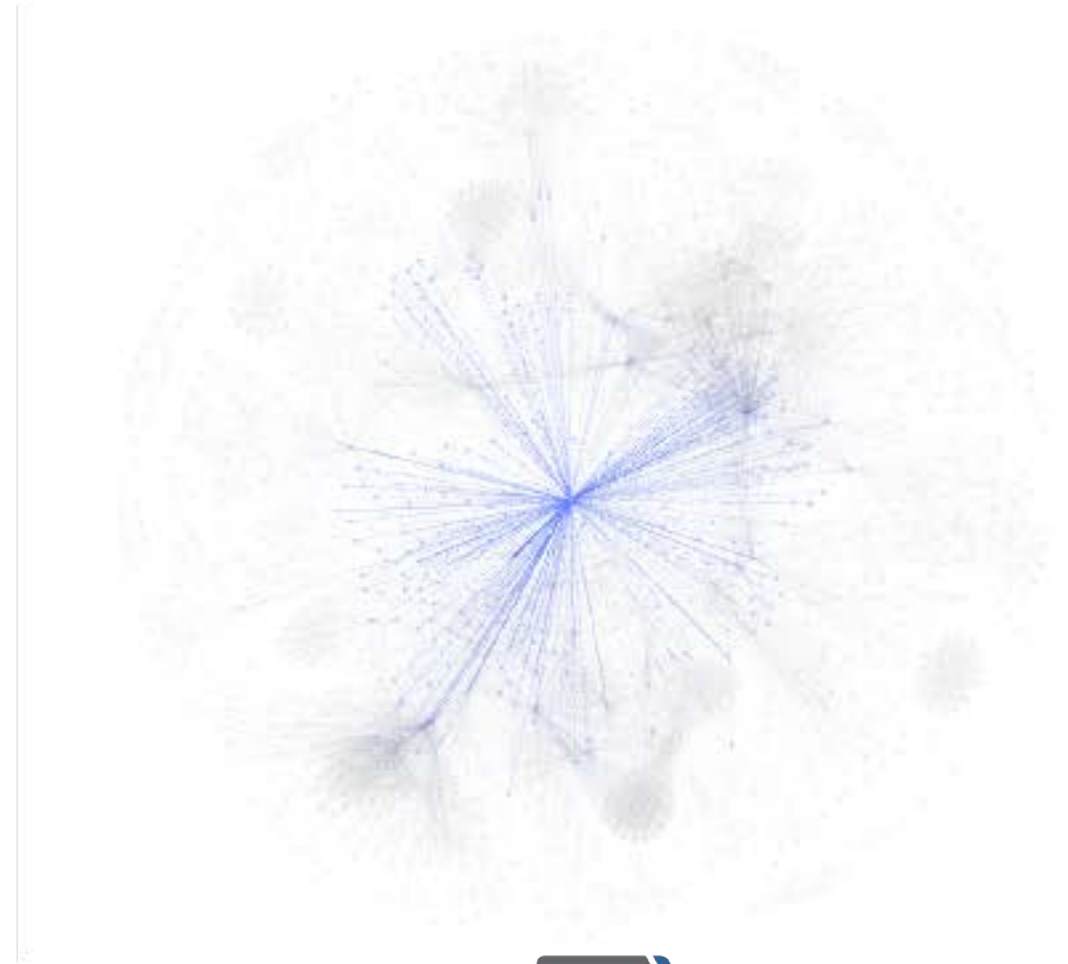


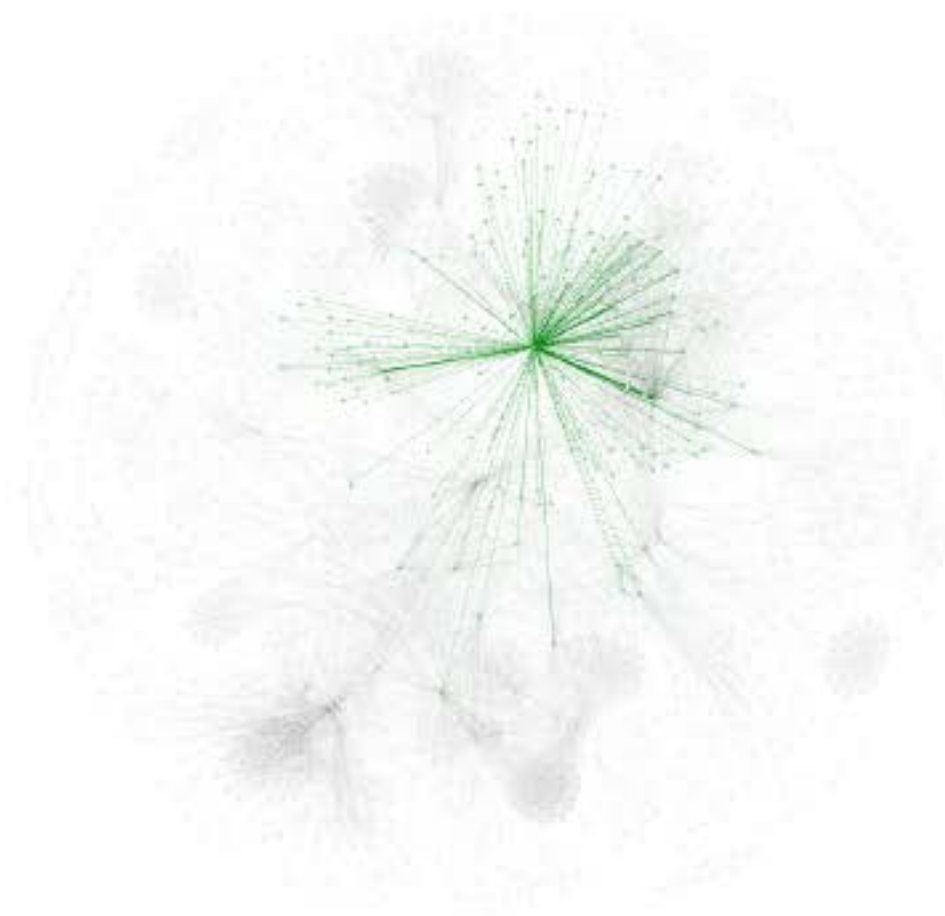
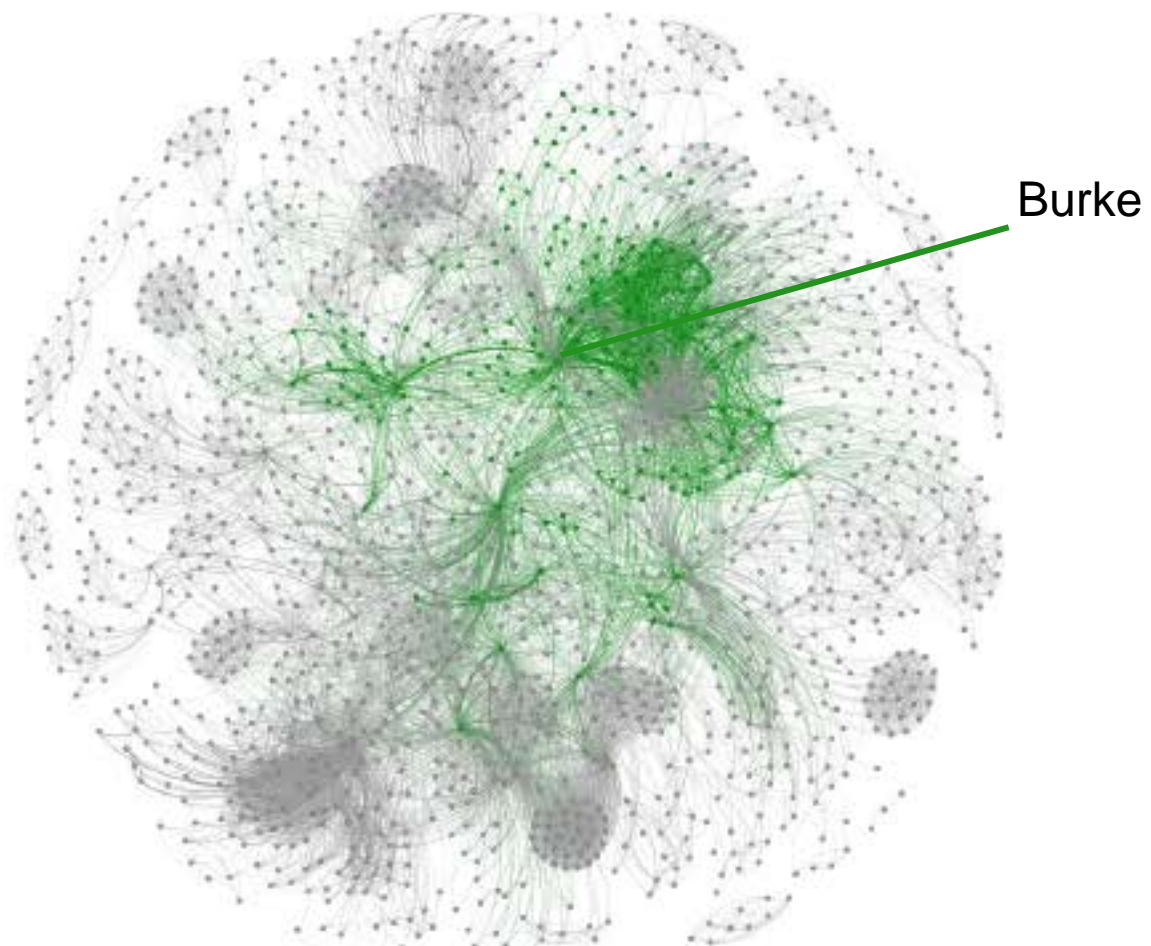
Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.

Lipsitch



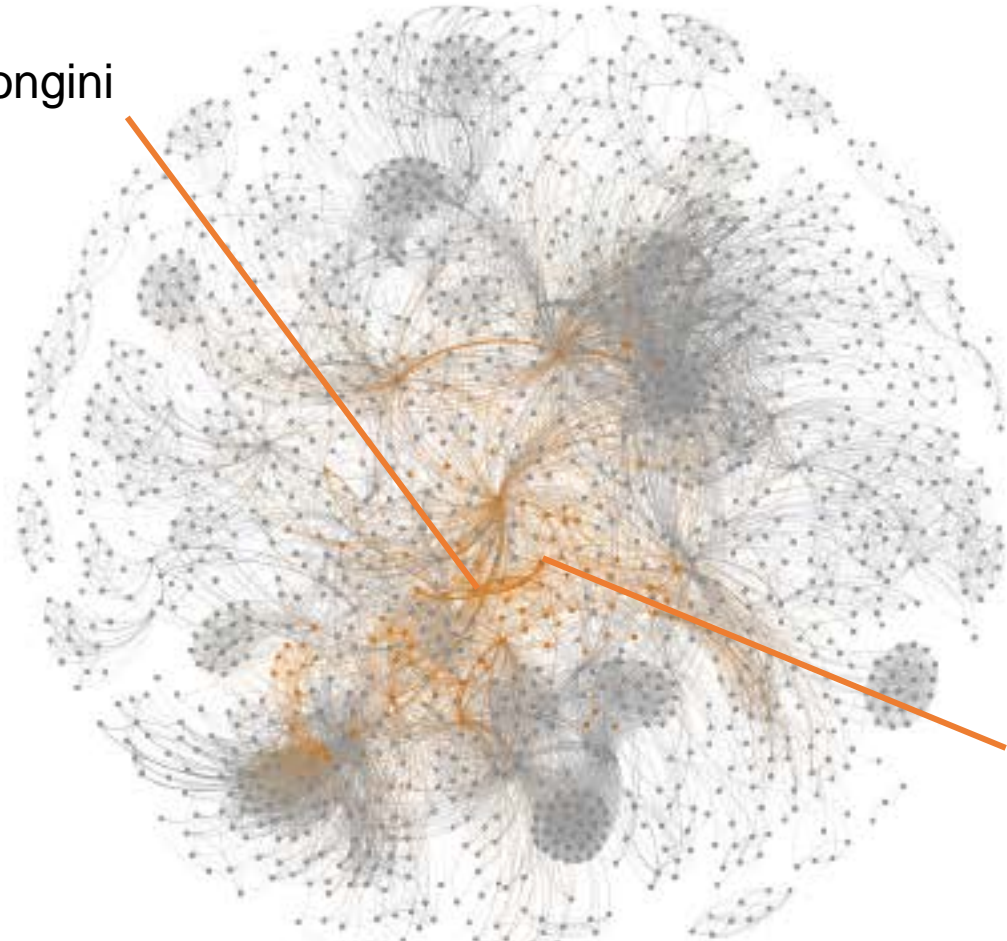
Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.



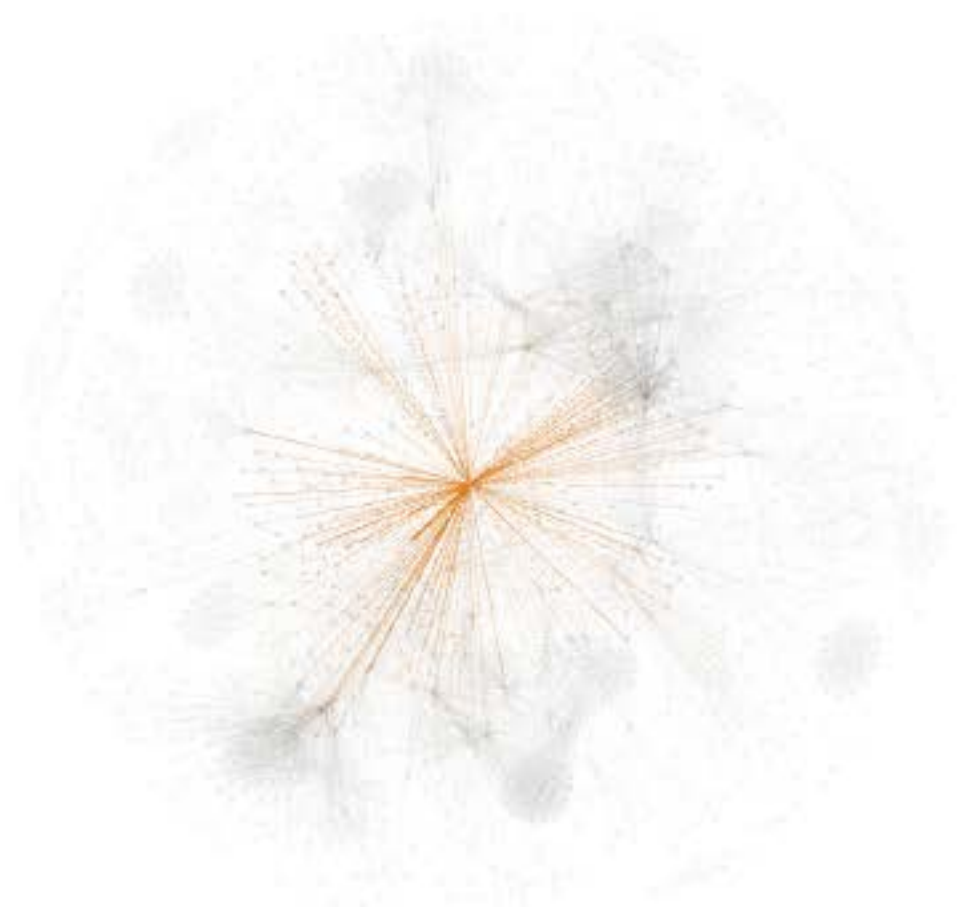


Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.

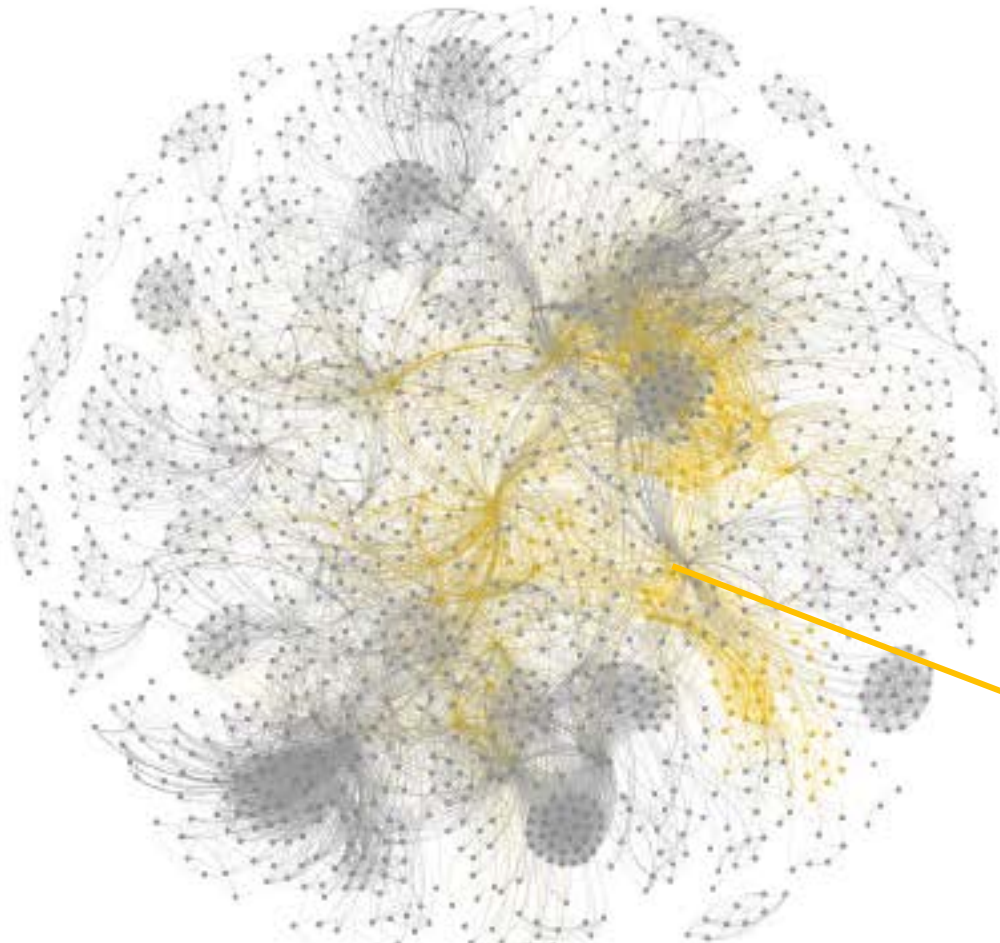
Longini



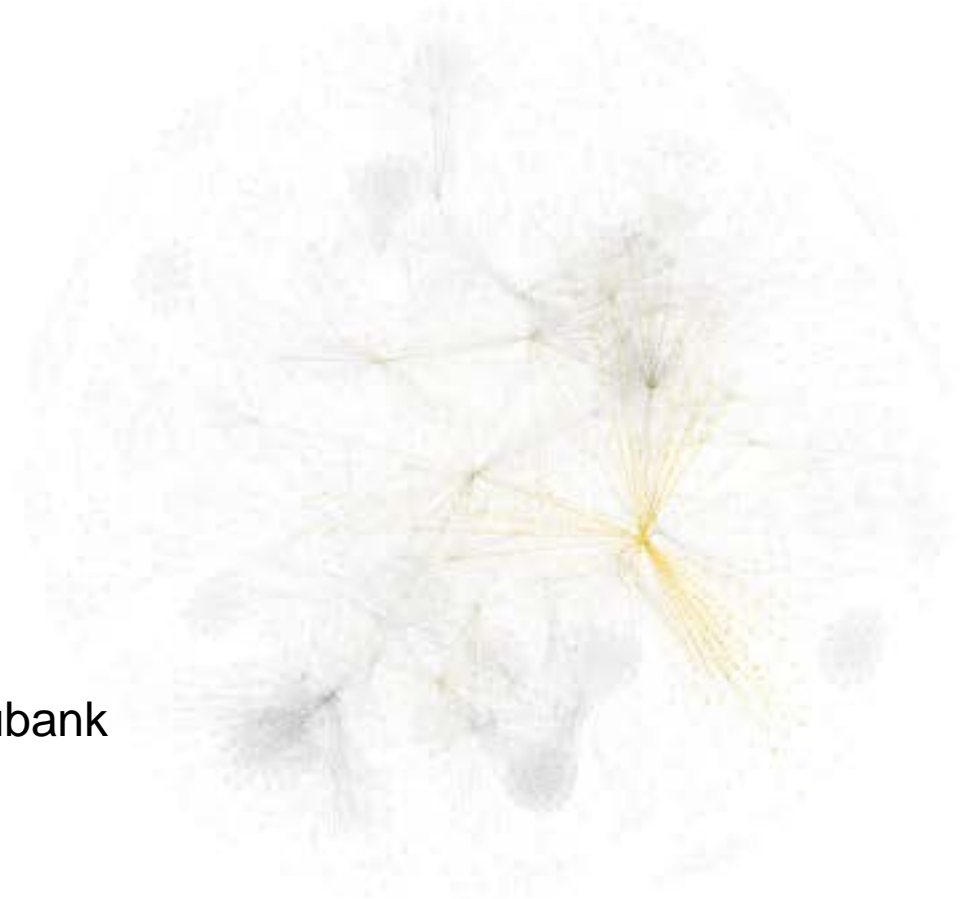
Halloran



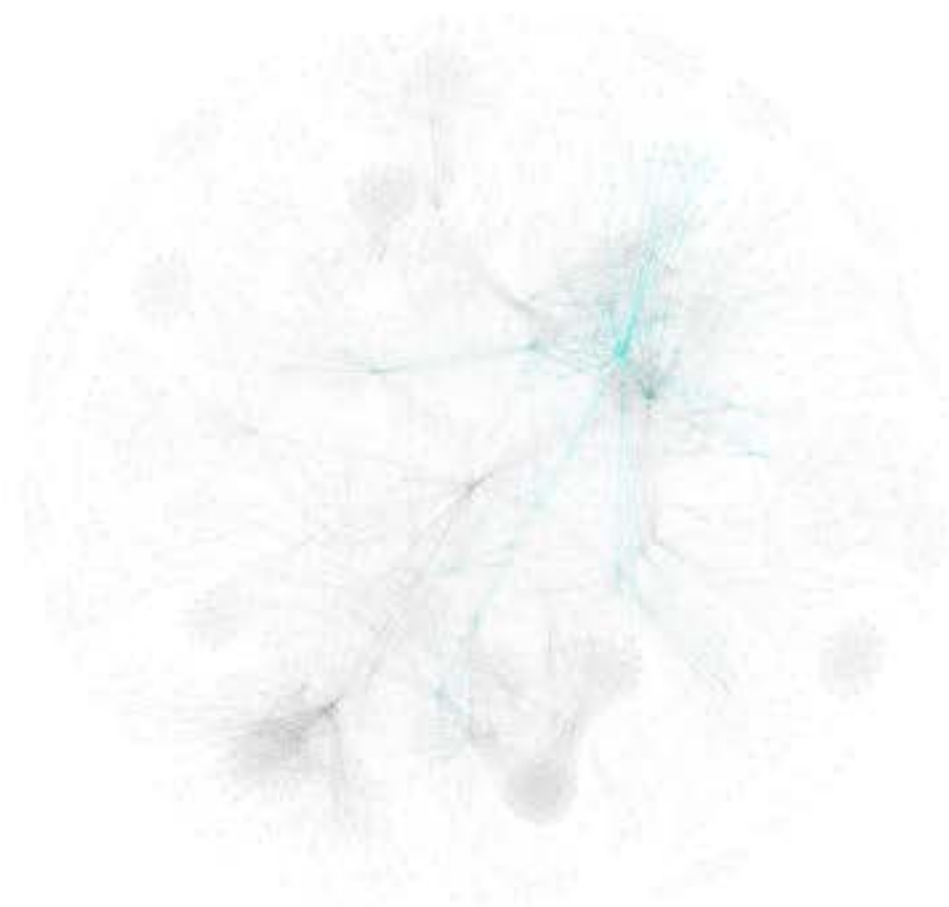
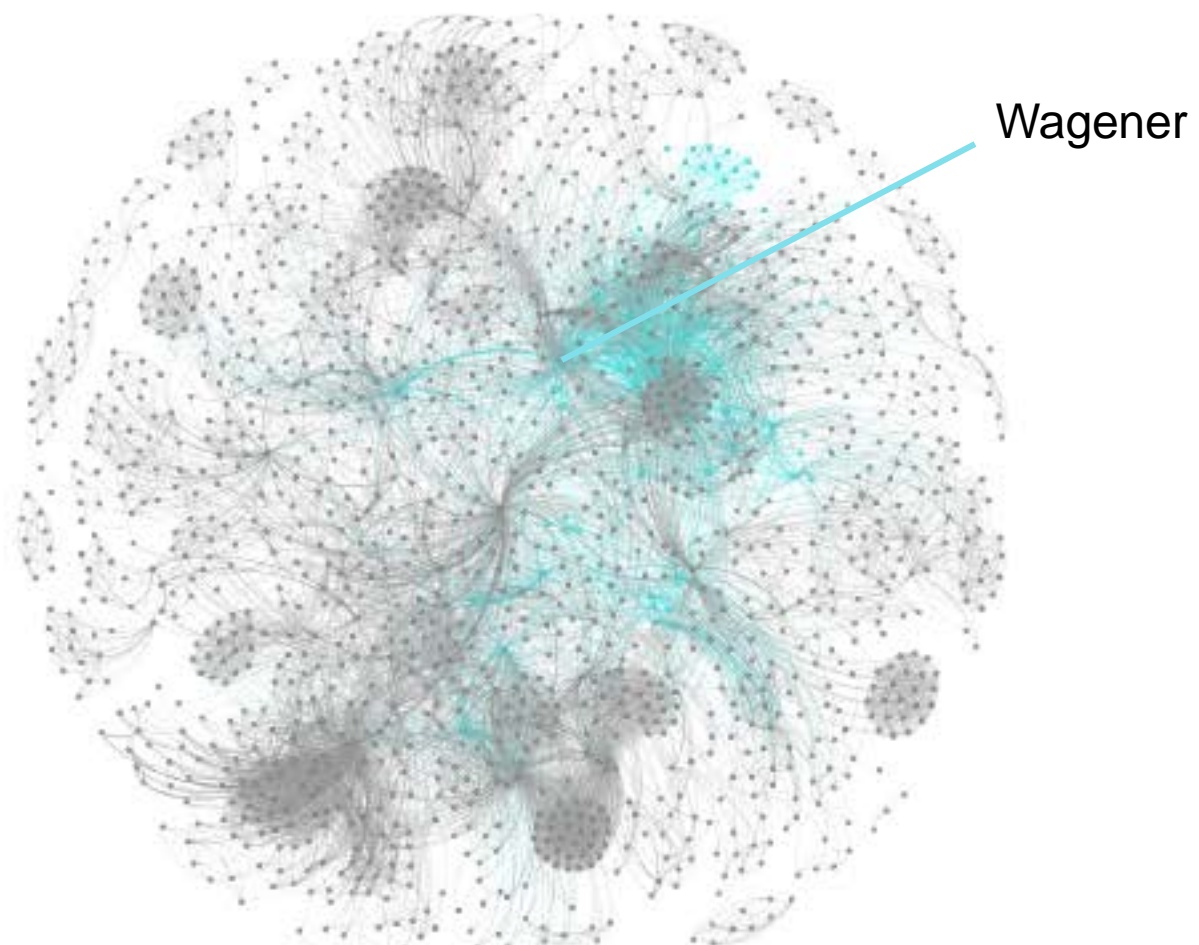
Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.



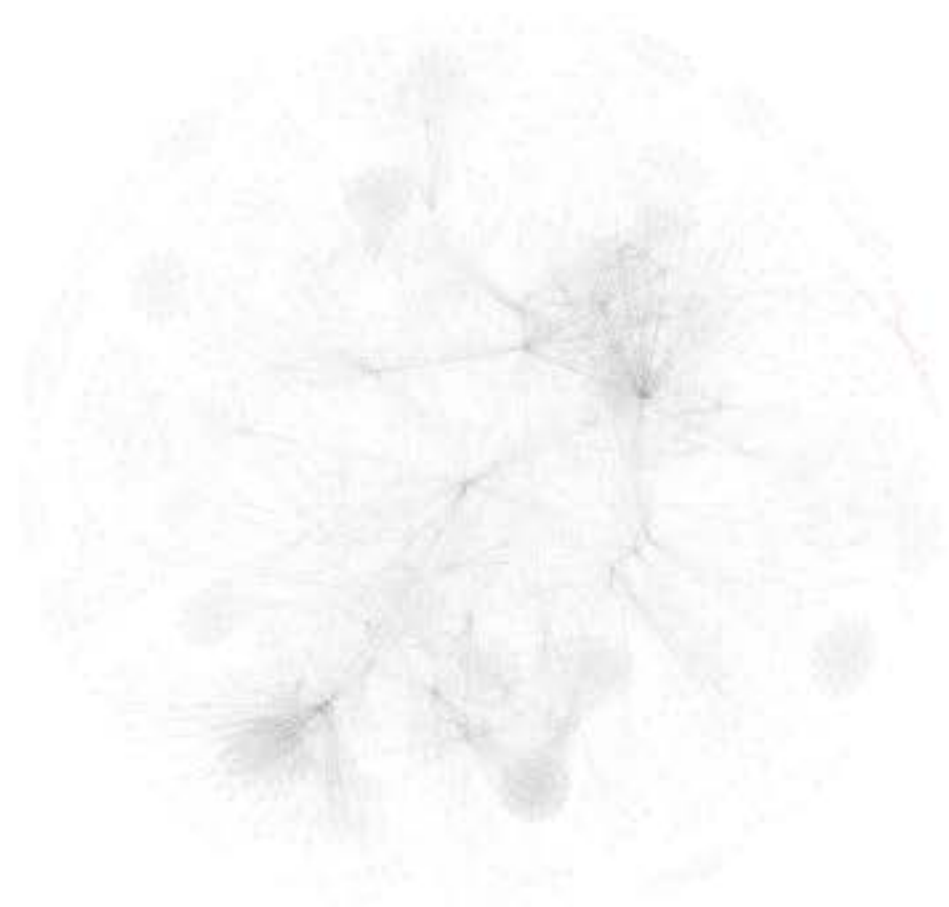
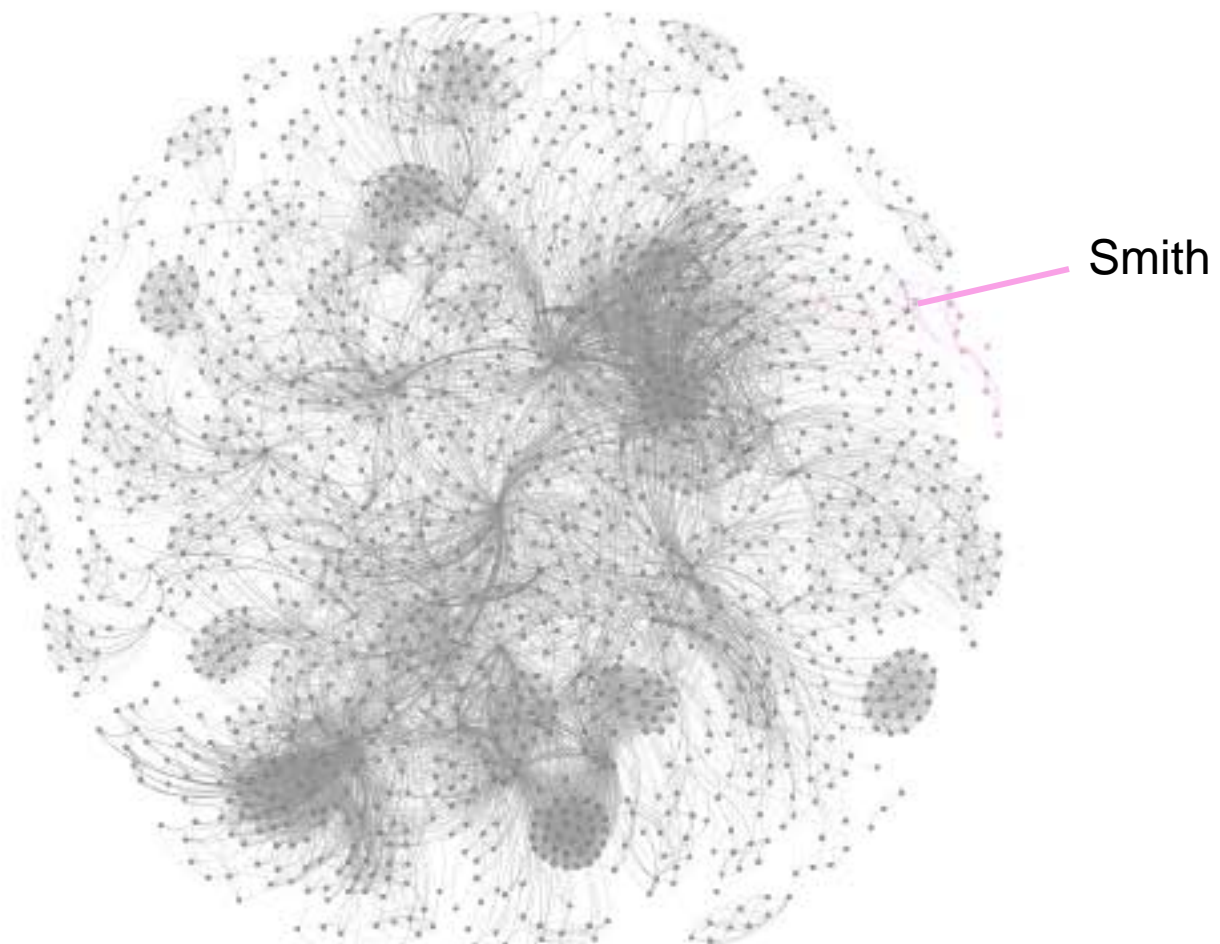
Eubank



Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.



Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.

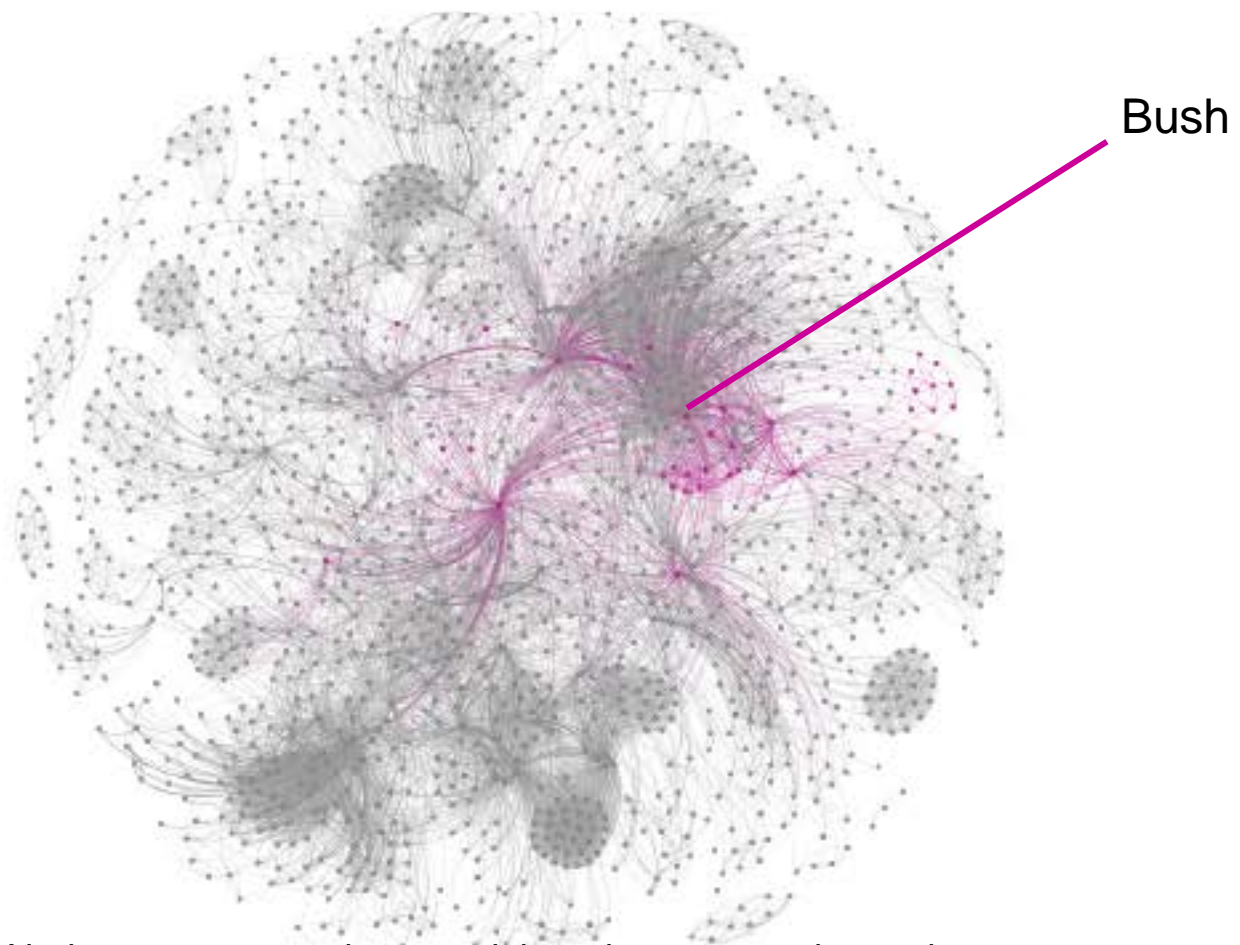


Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.

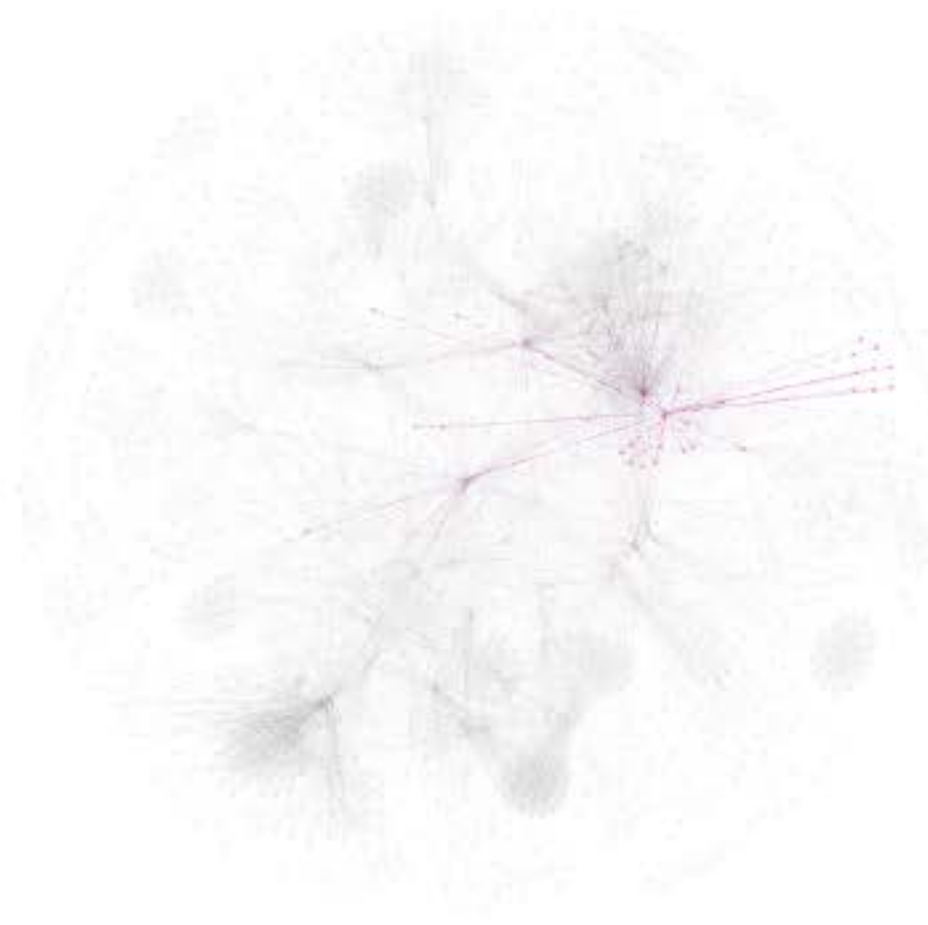


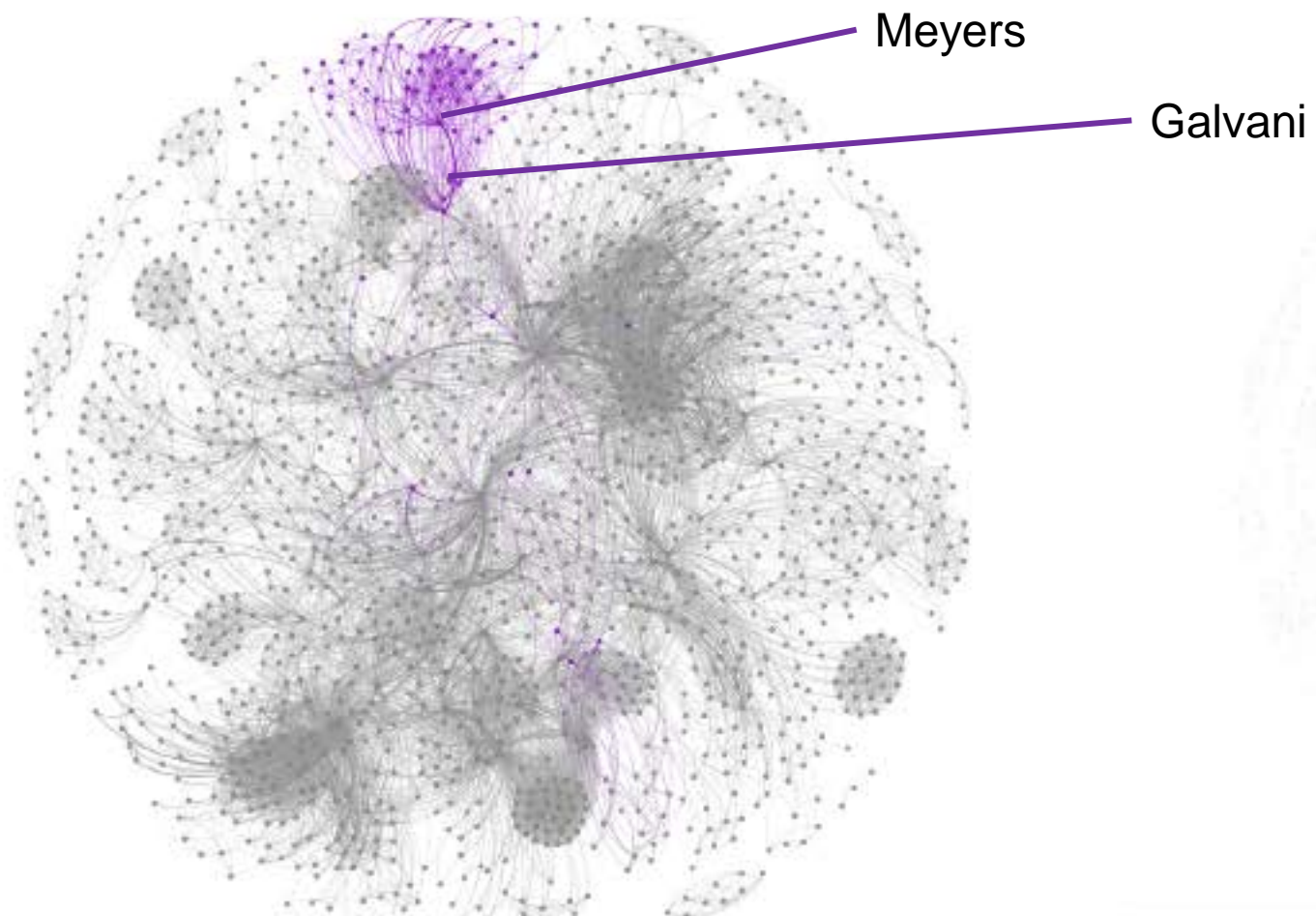
Platt

Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.

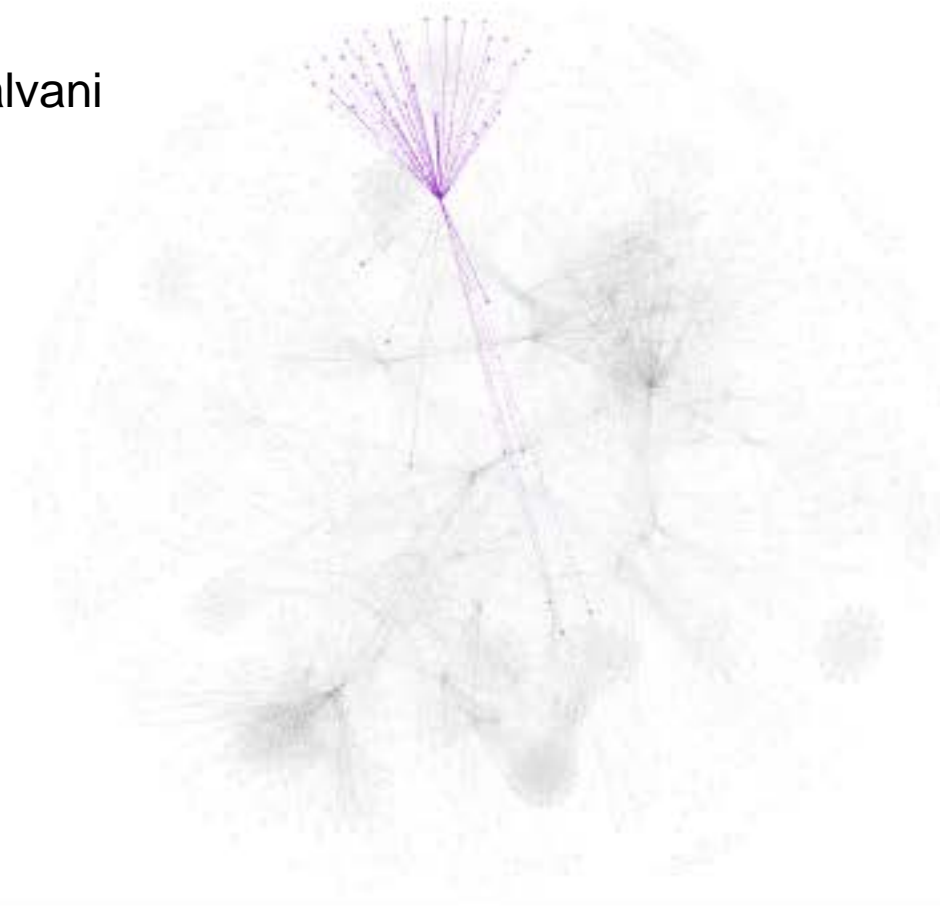


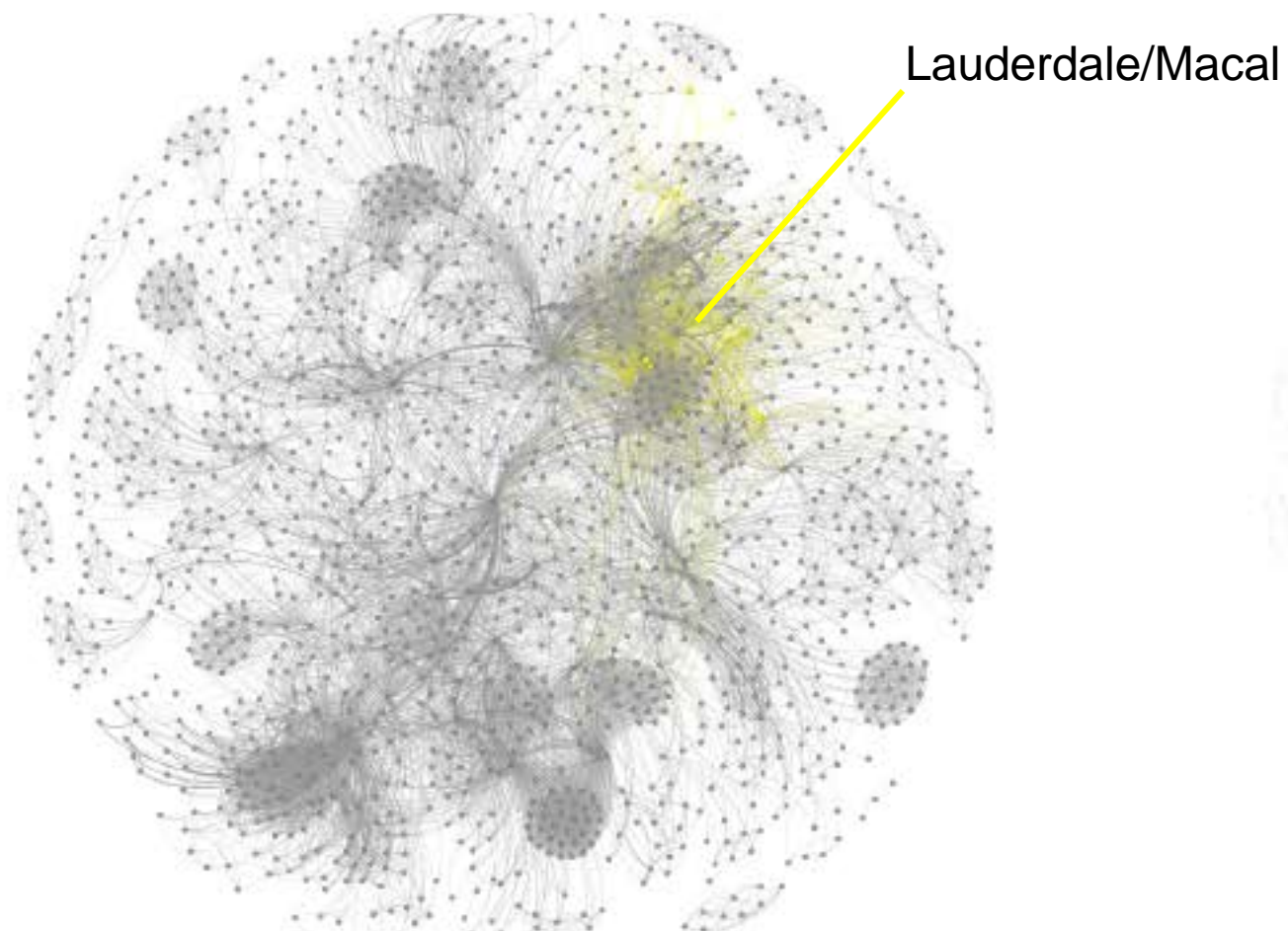
Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.



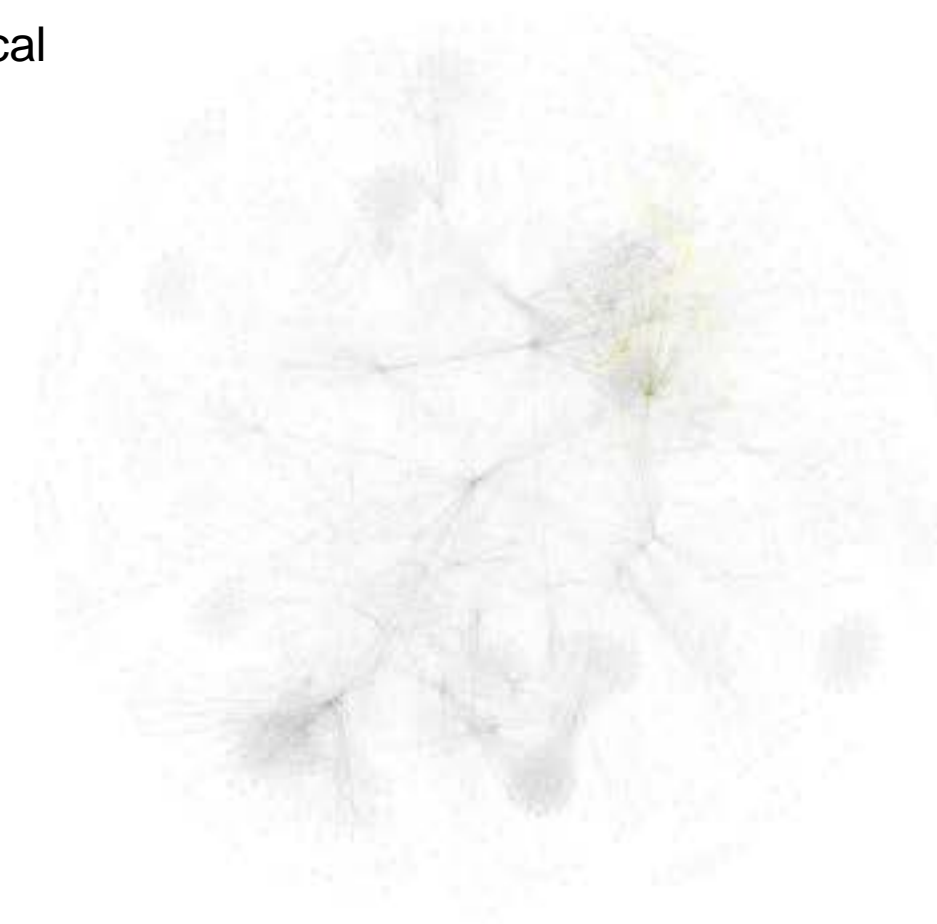


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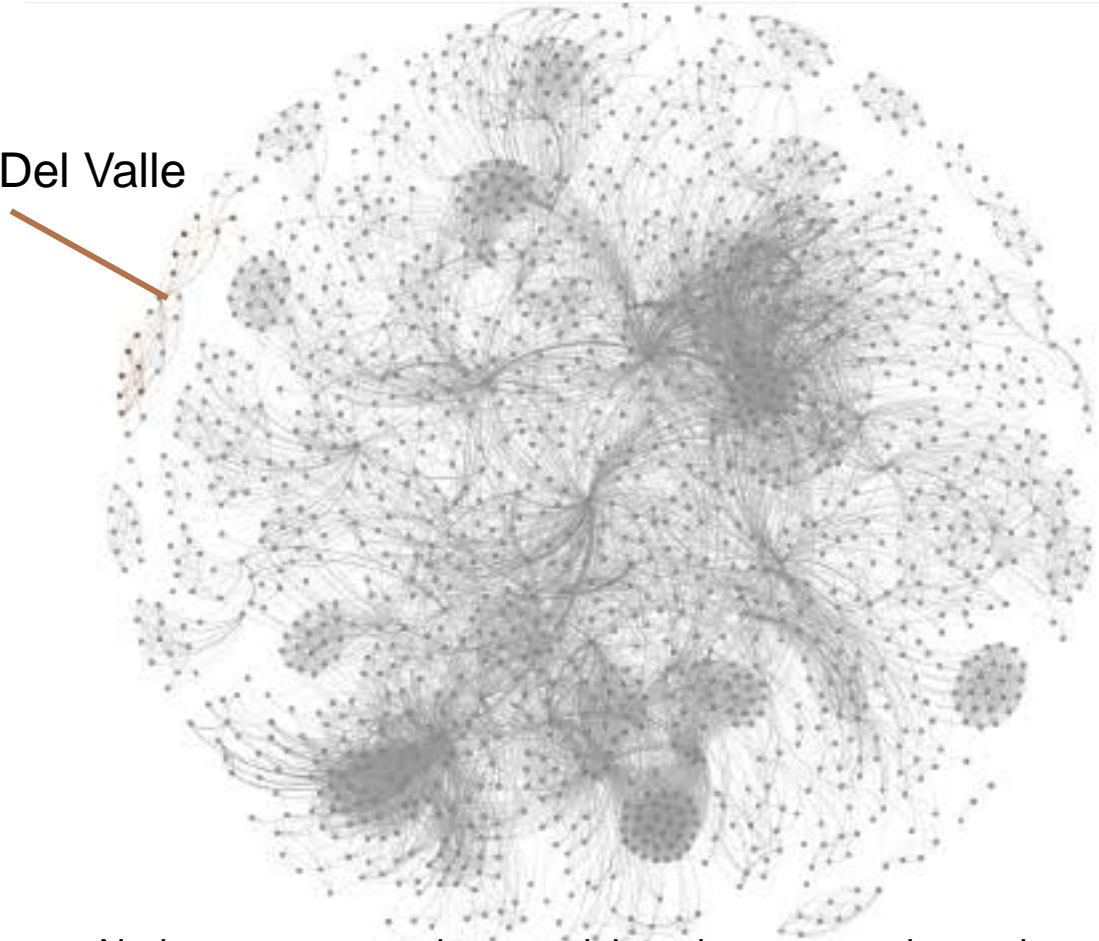




Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.

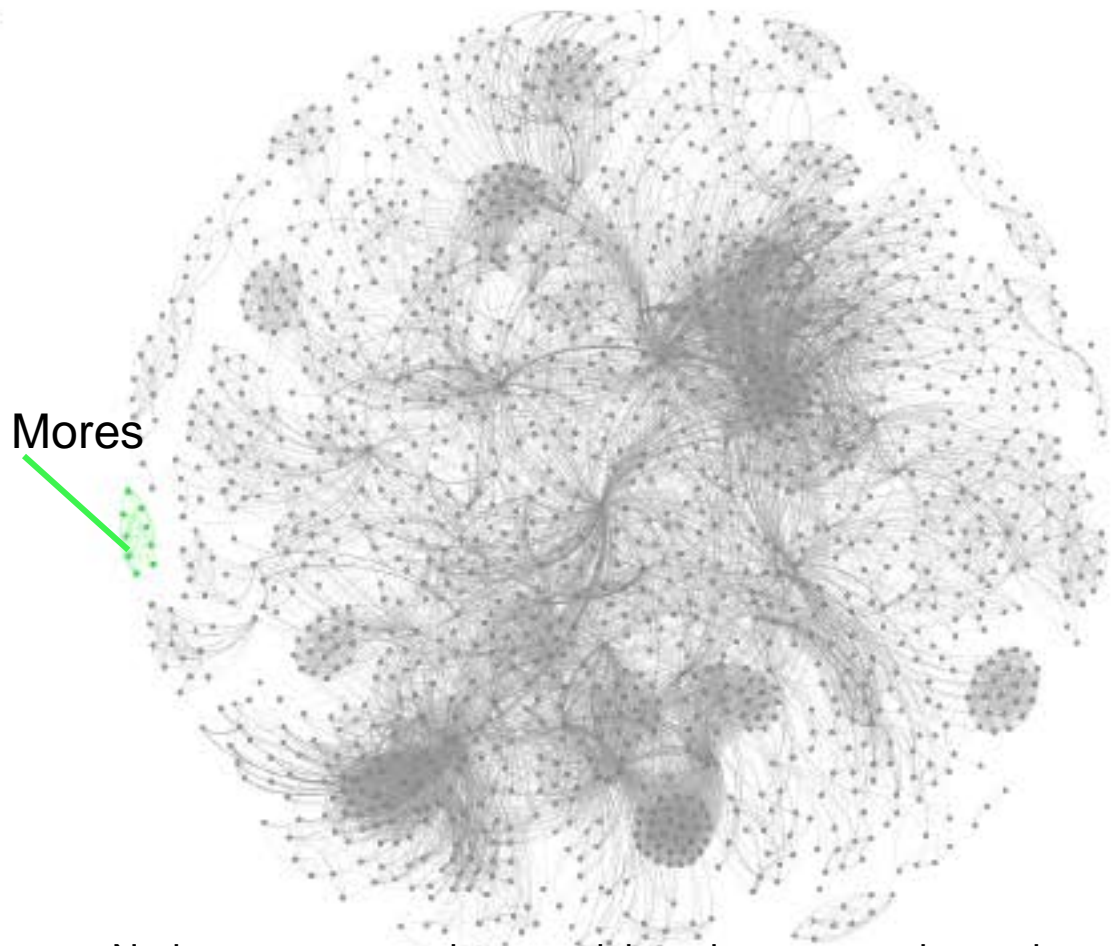


Del Valle



Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.

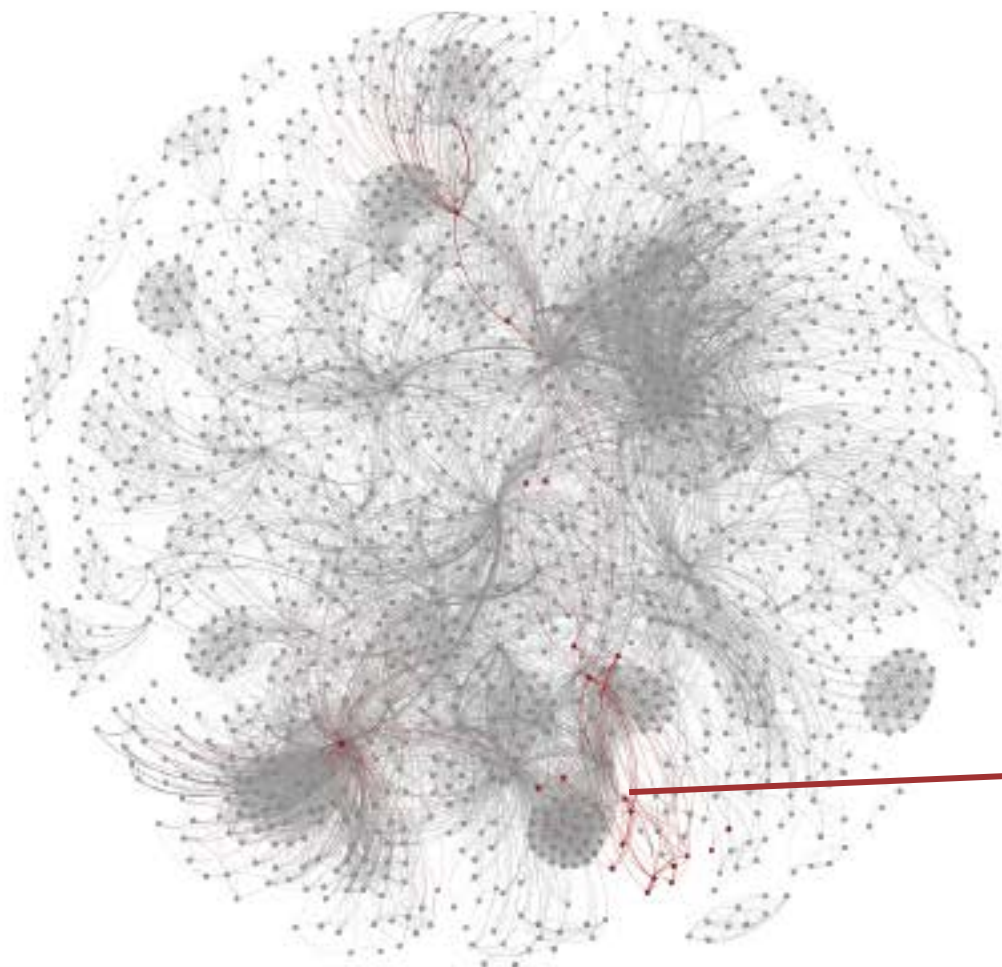




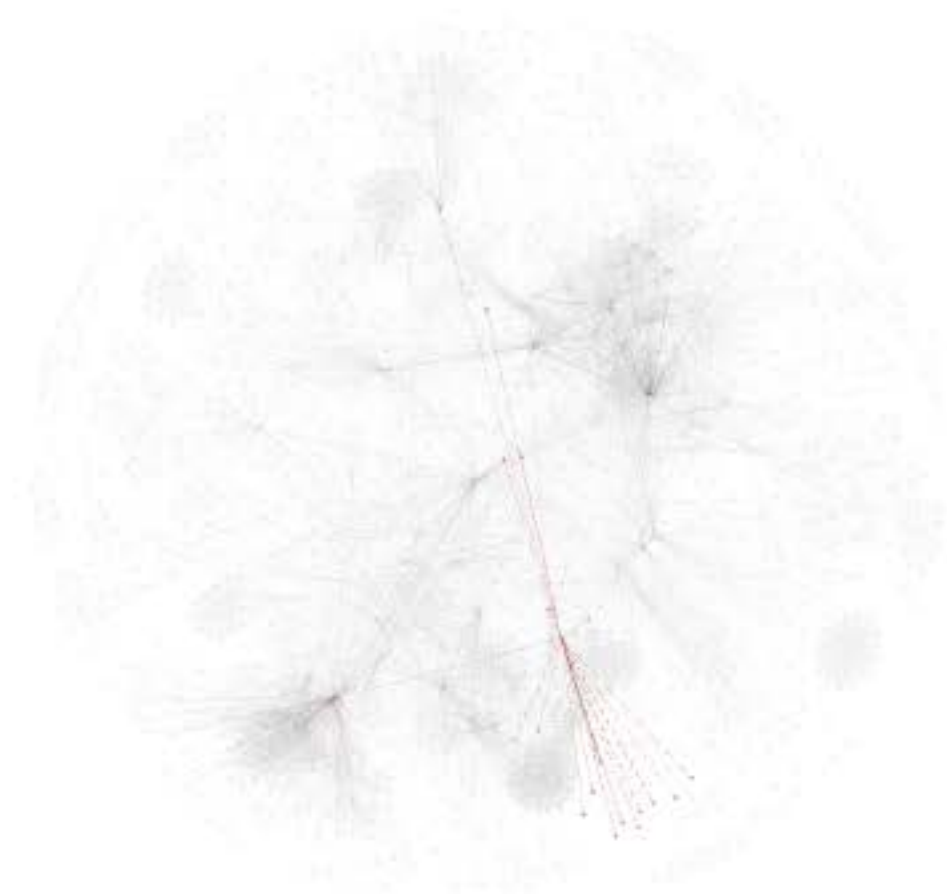
Mores



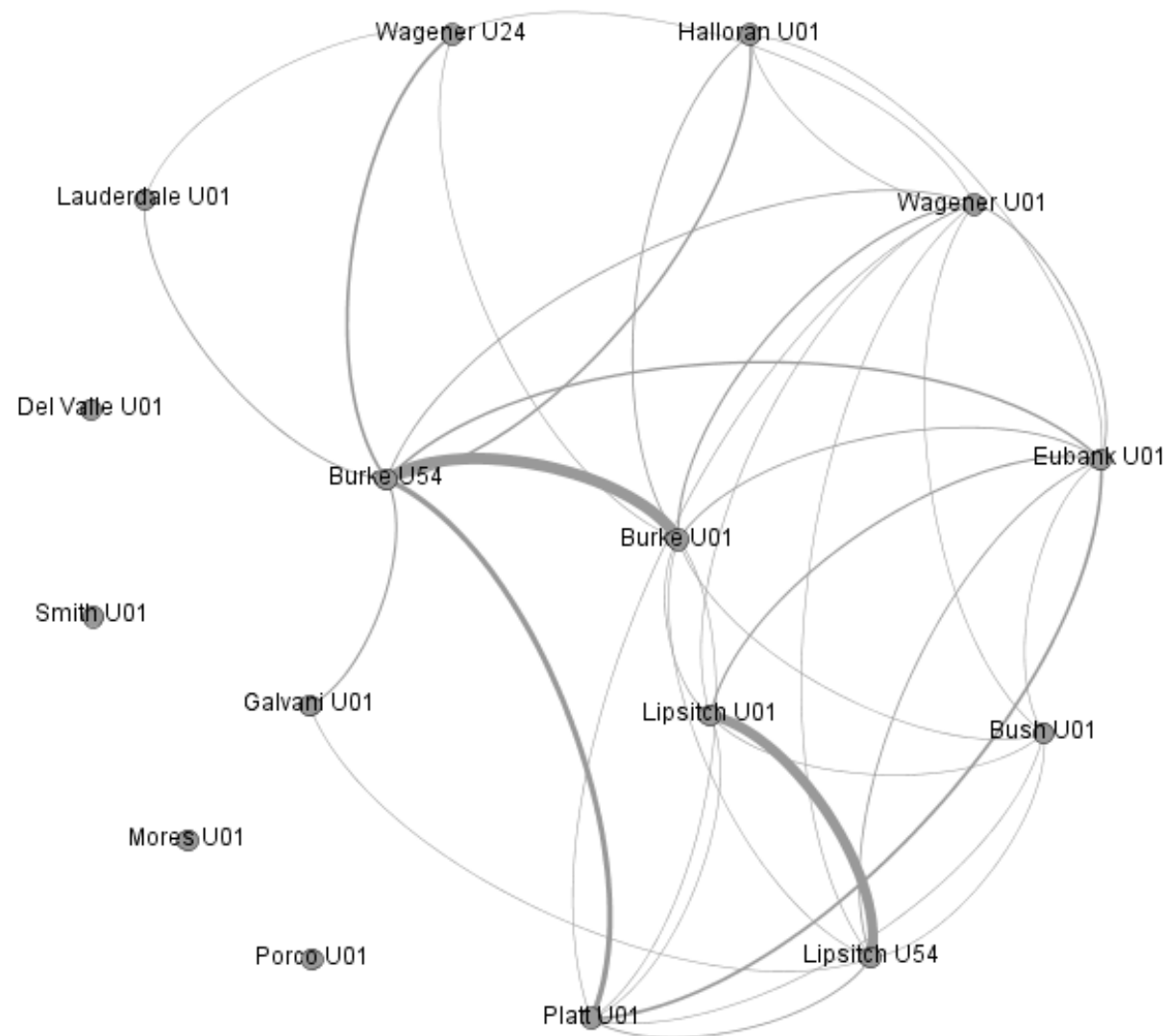
Nodes represent authors, and the edges connecting nodes indicate collaborations resulting in a peer-reviewed publication.



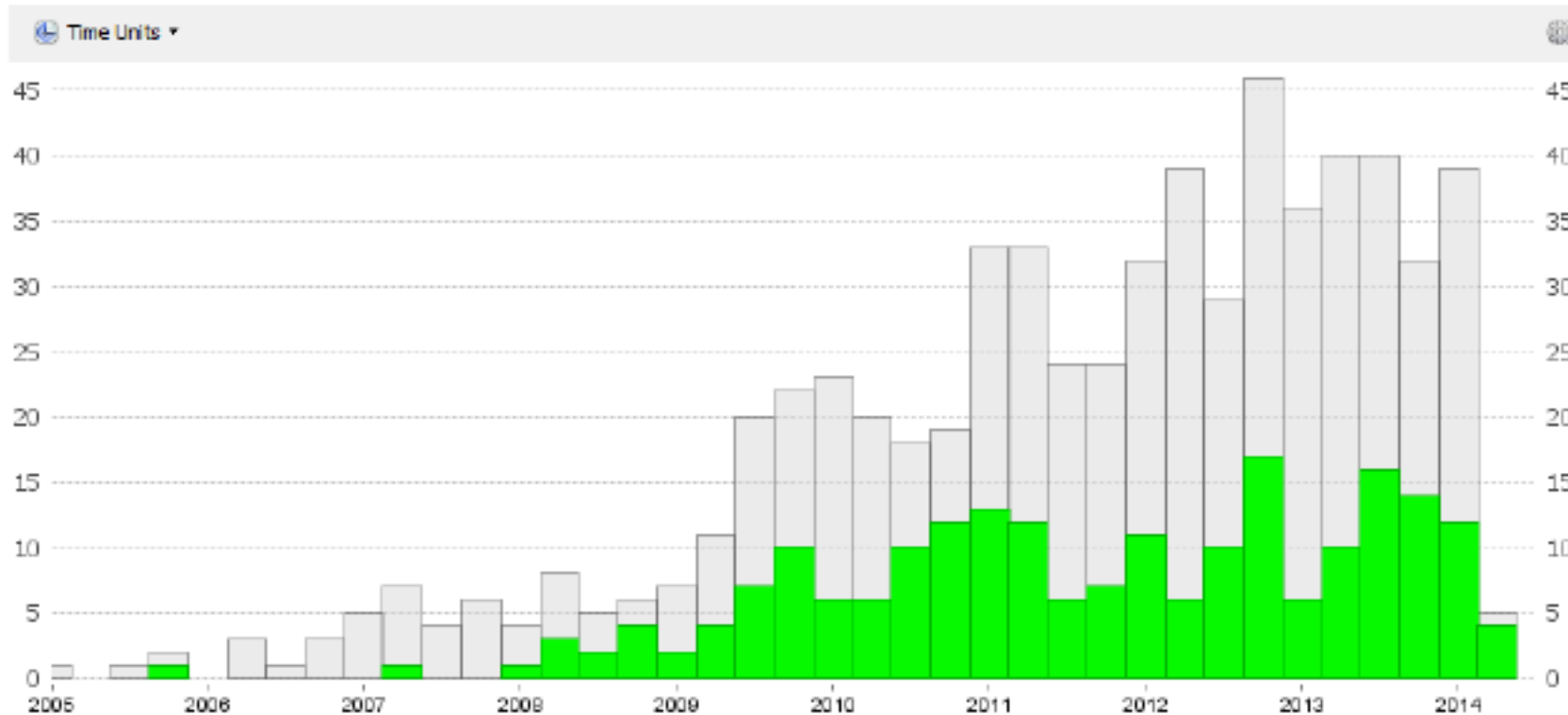
Porco



Depicting collaborations between grants

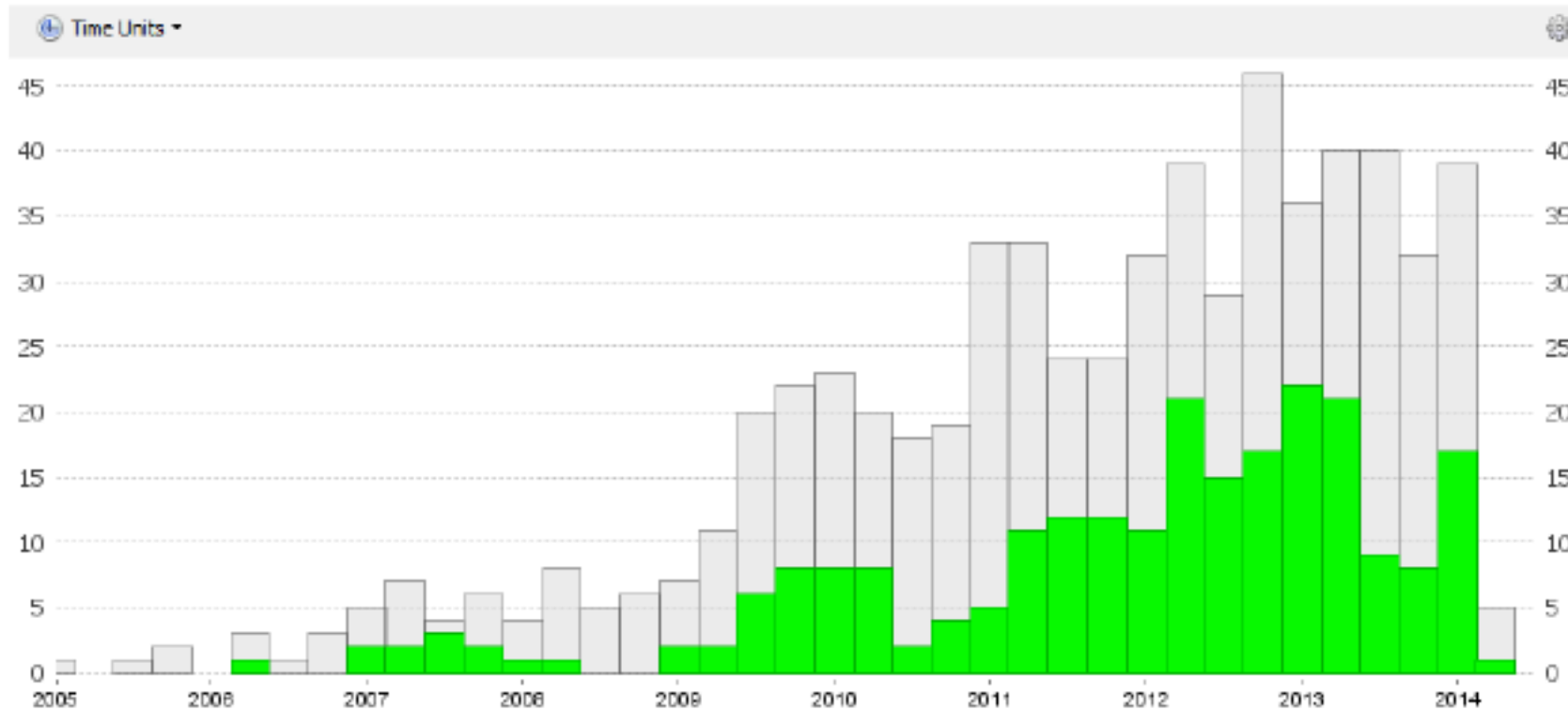


Visualizing the productivity



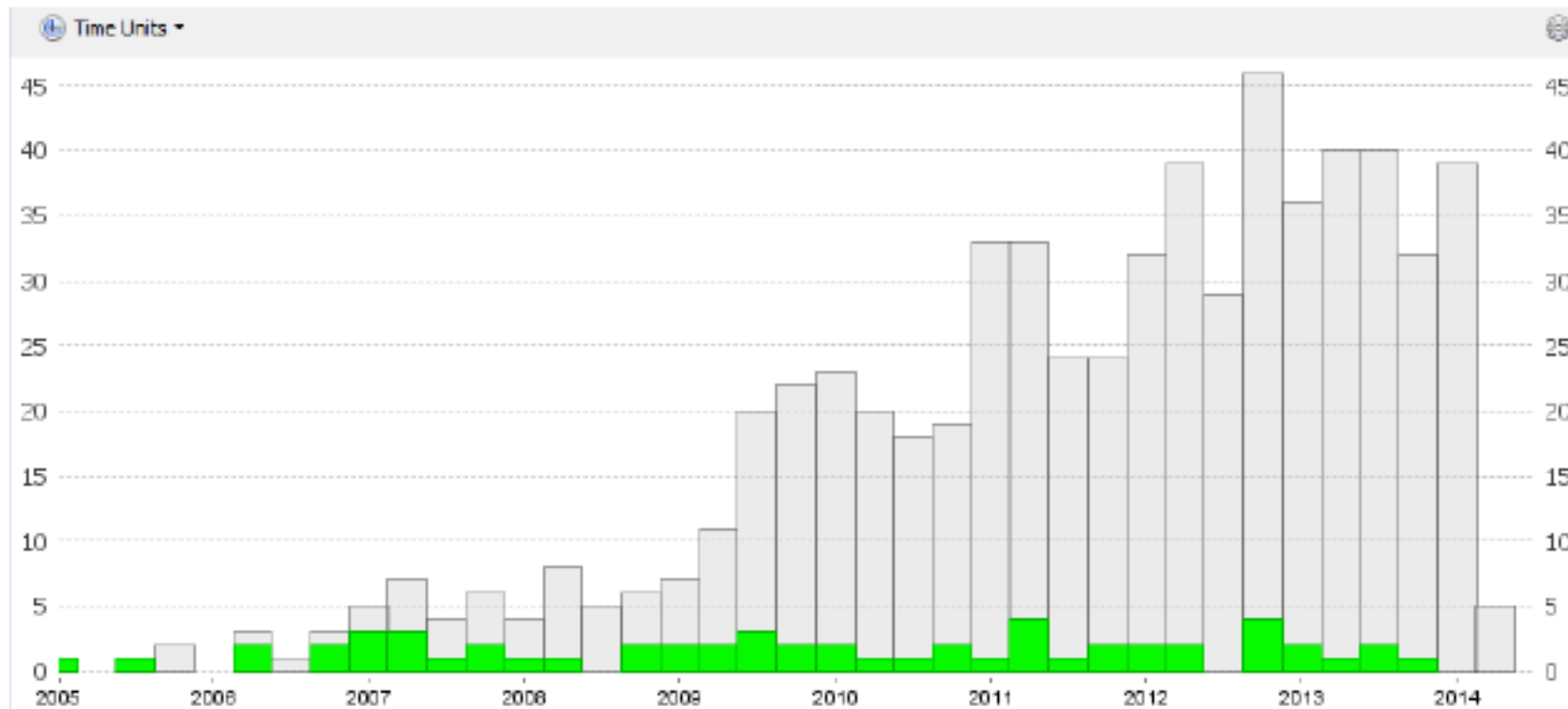
Lipsitch U54 and U01

Visualizing the productivity

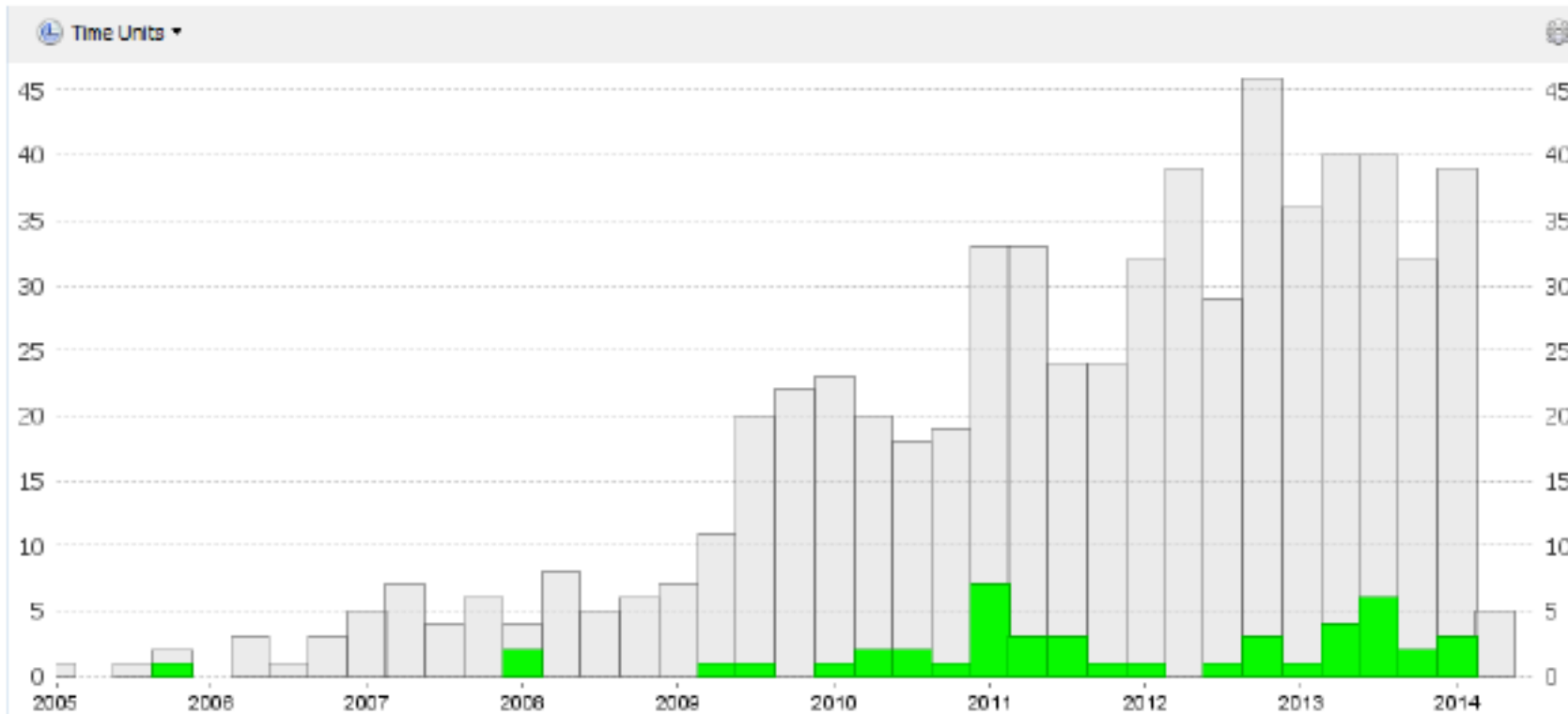


Burke U54 and U01

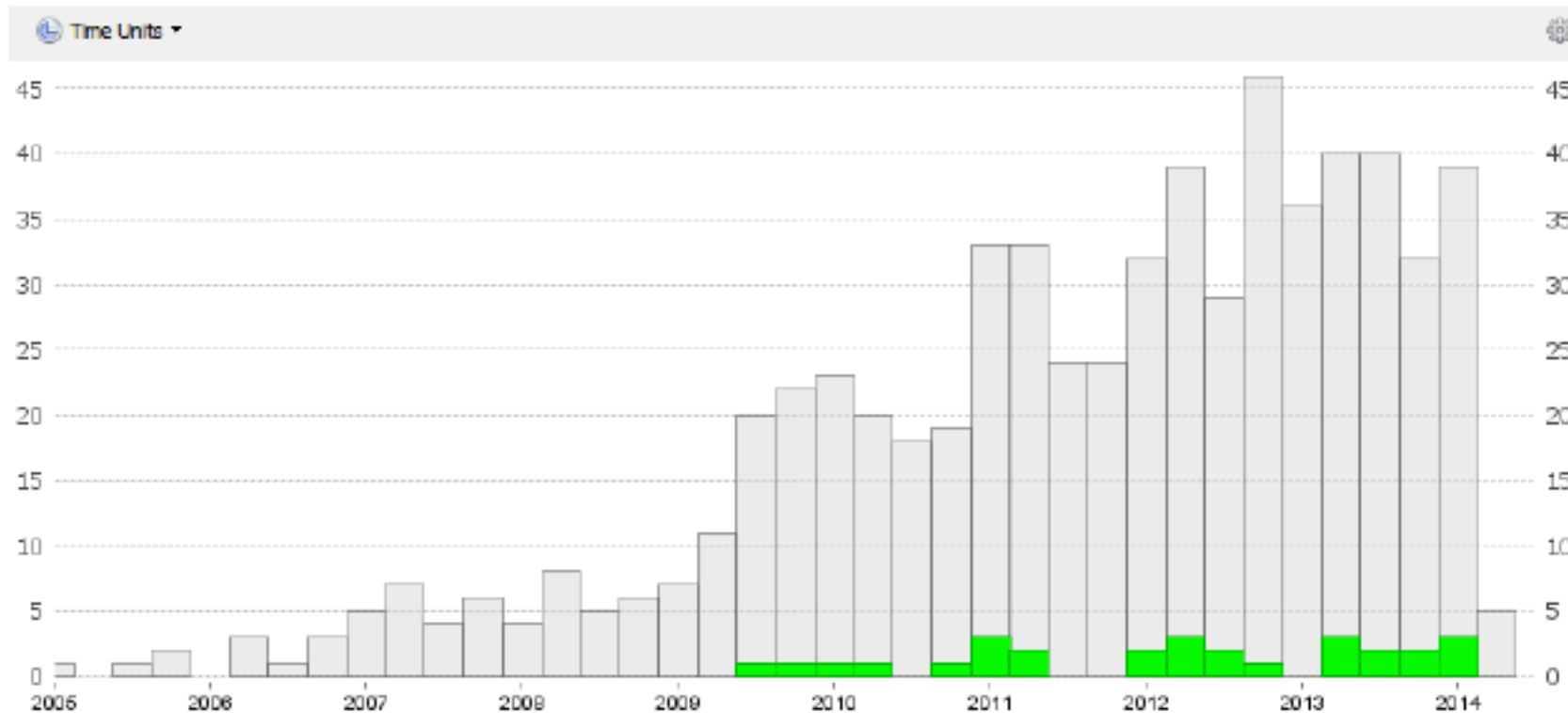
Visualizing the productivity



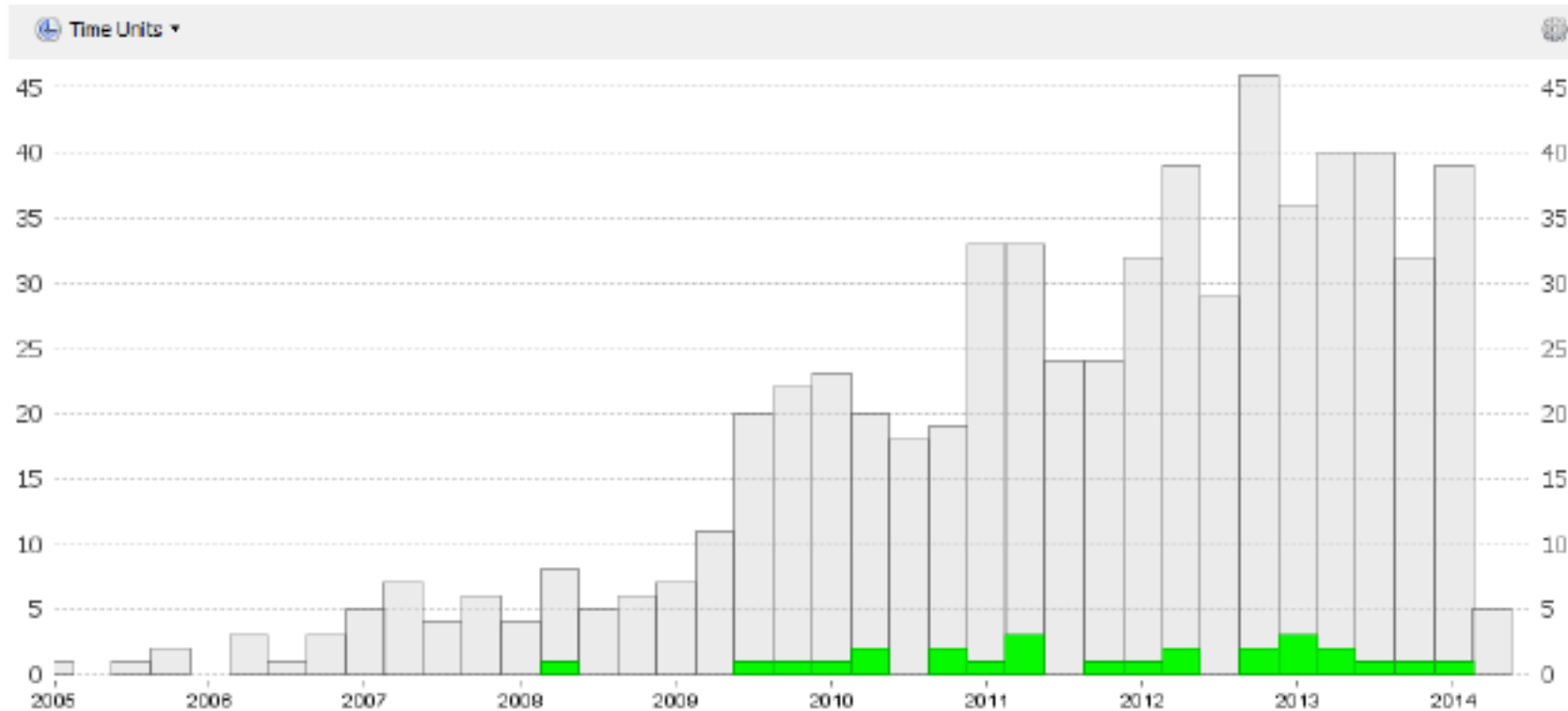
Visualizing the productivity



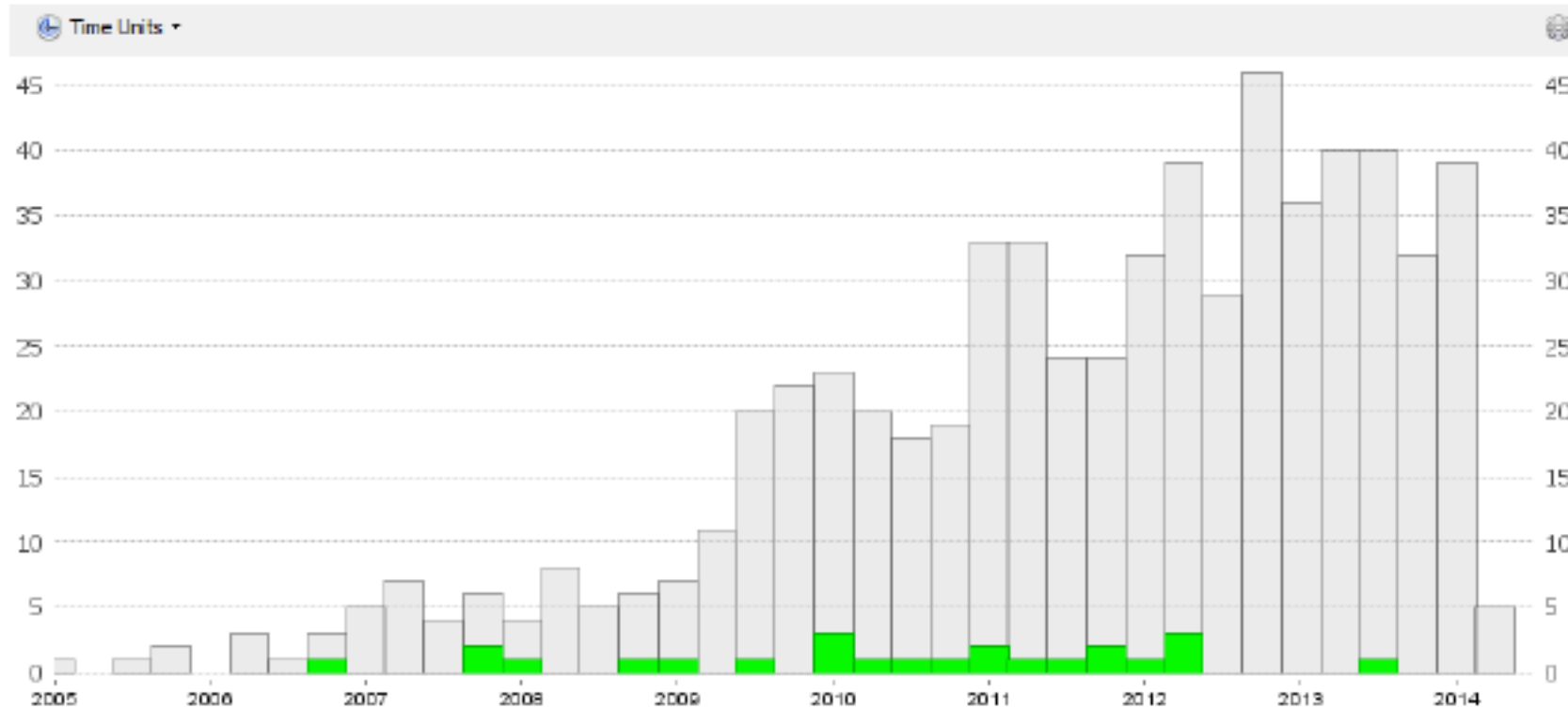
Visualizing the productivity



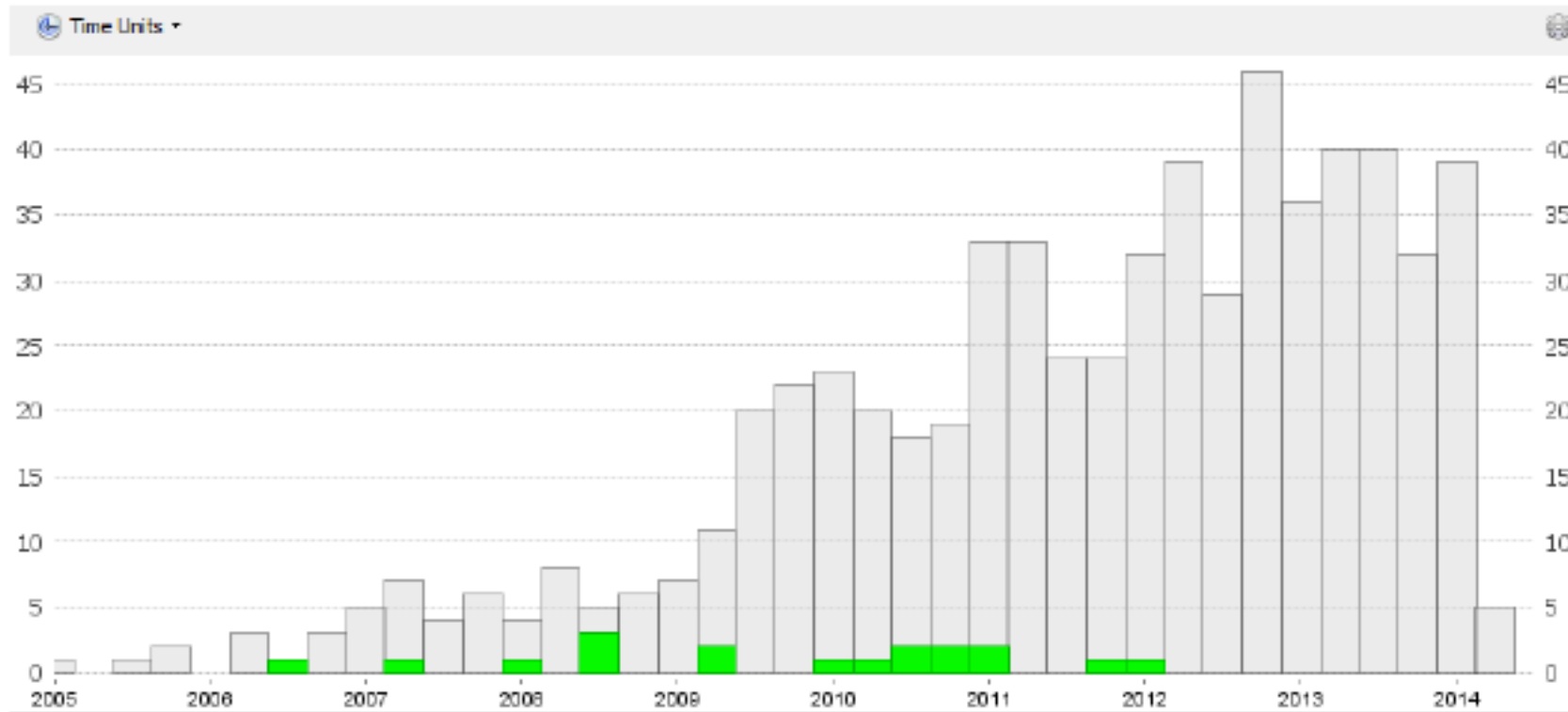
Visualizing the productivity



Visualizing the productivity

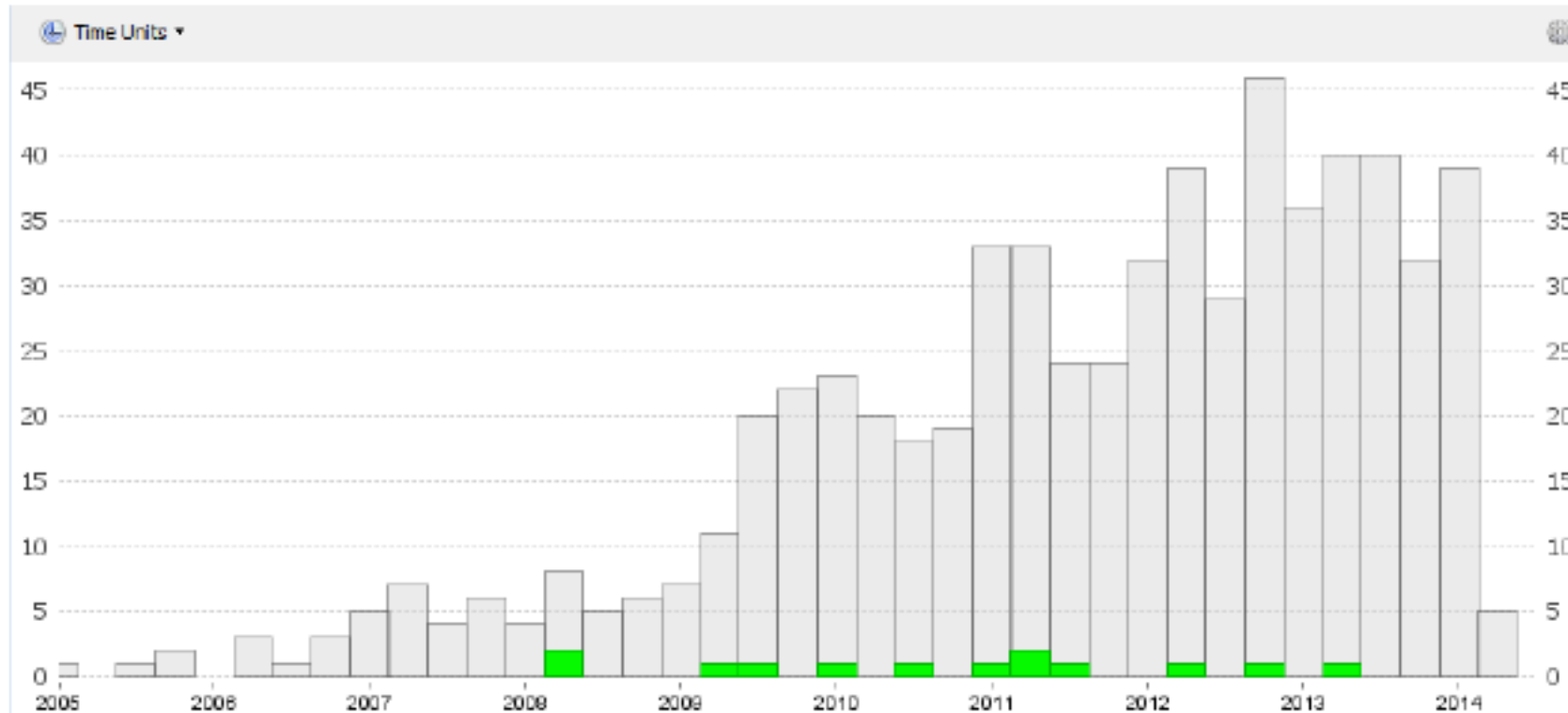


Visualizing the productivity

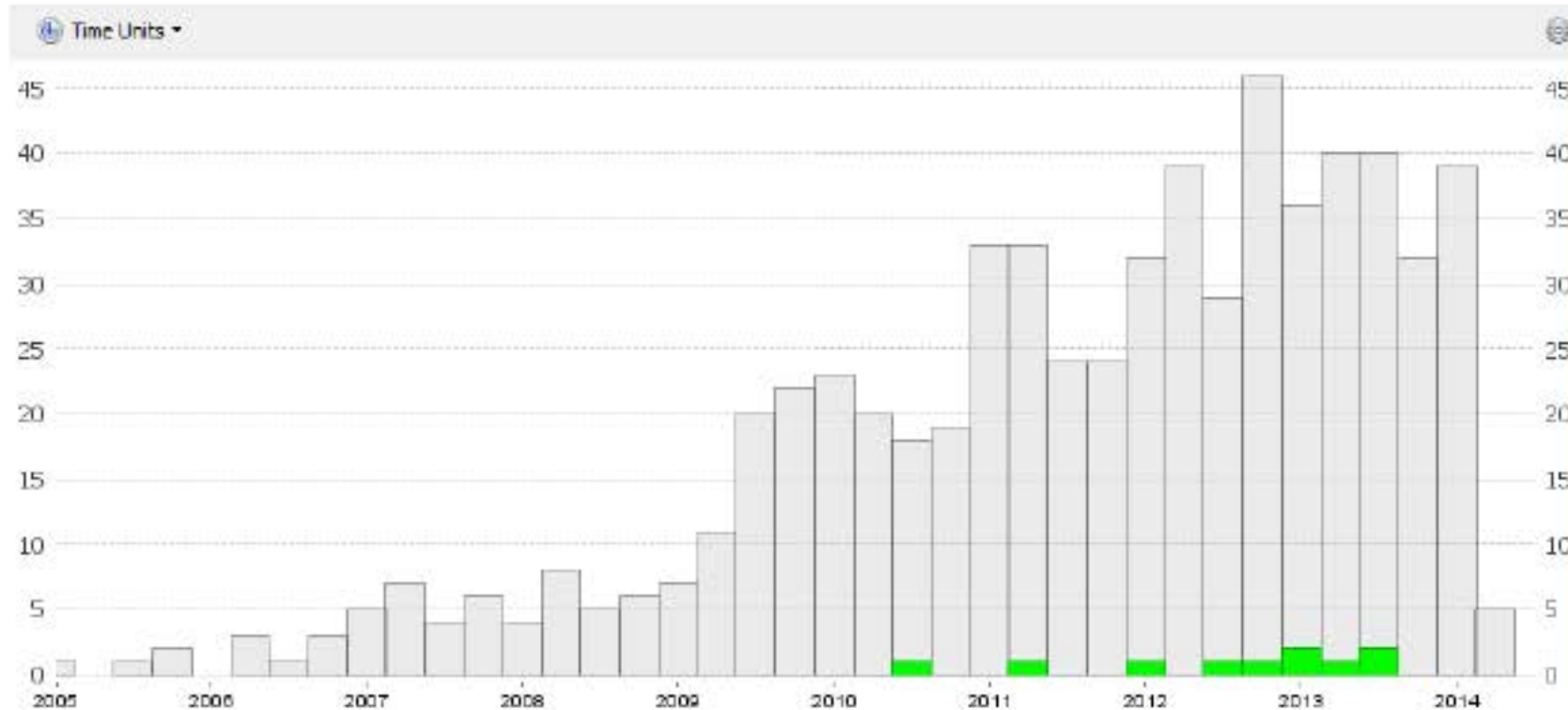


Wagener U01 and U24

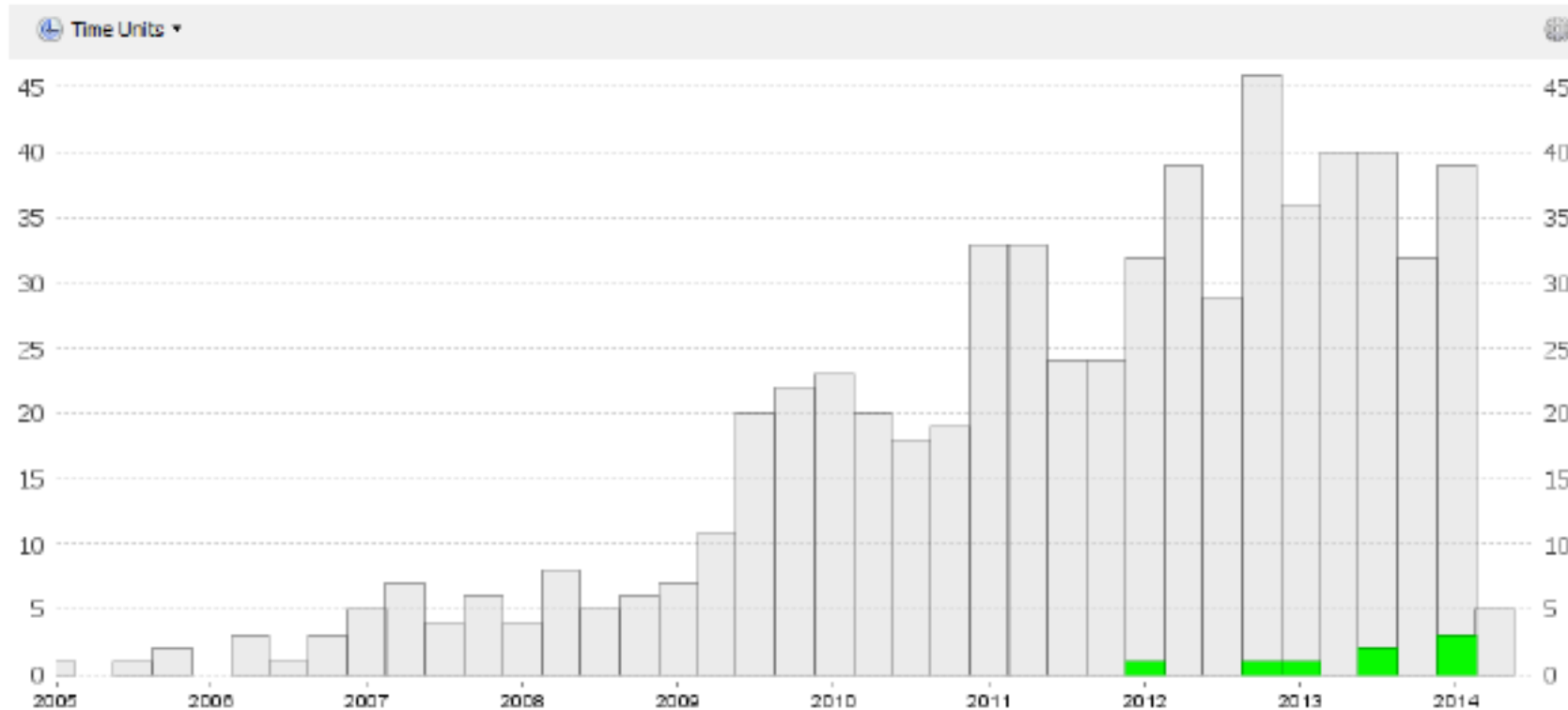
Visualizing the productivity



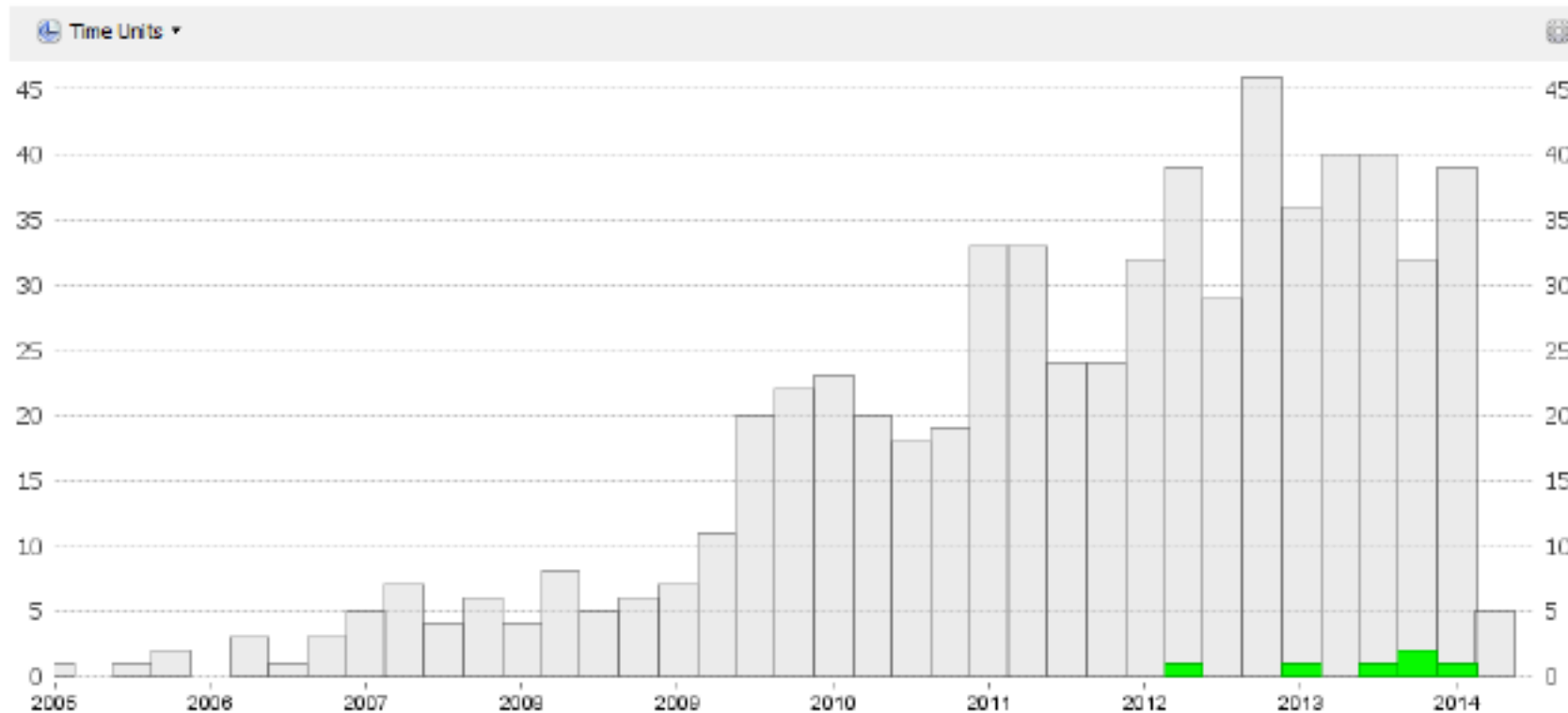
Visualizing the productivity



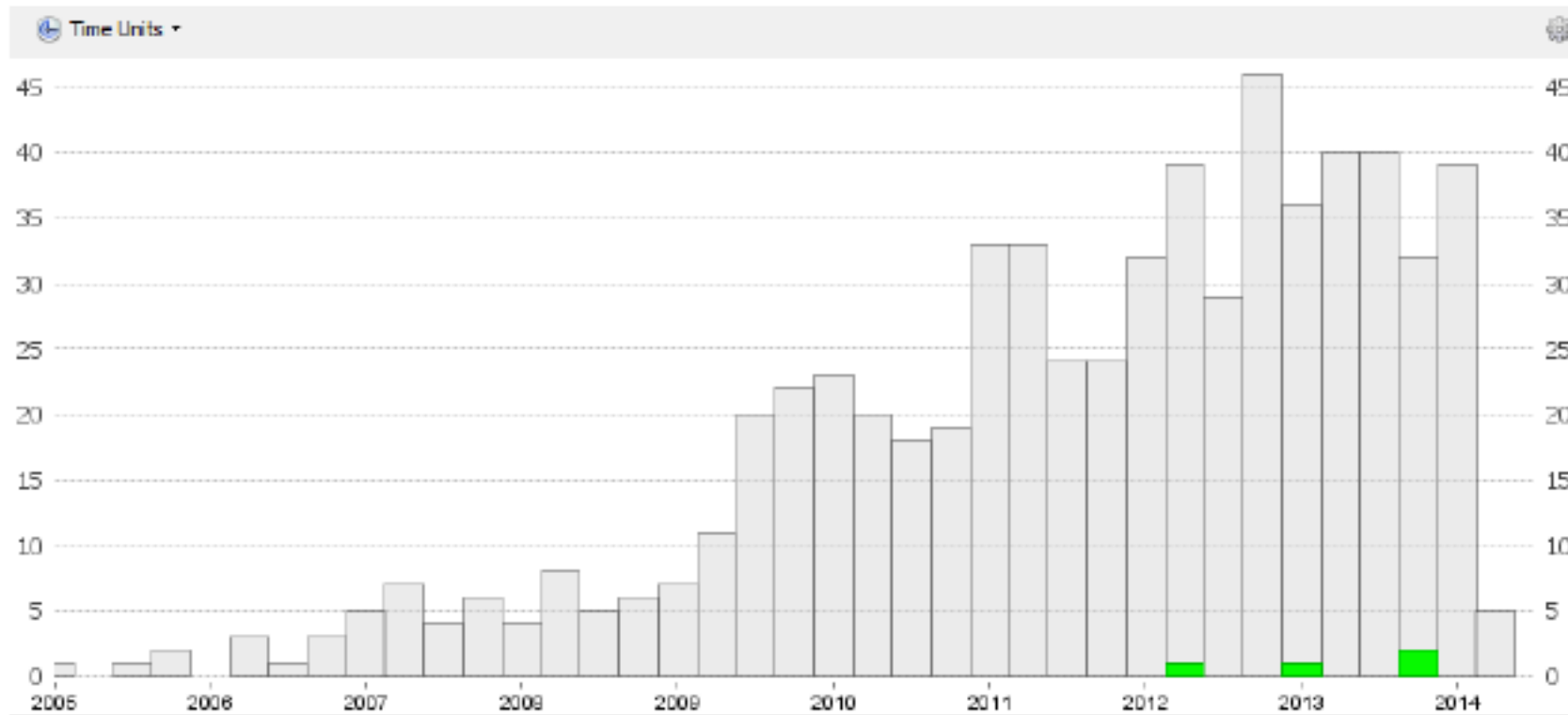
Visualizing the productivity



Visualizing the productivity



Visualizing the productivity



Conclusions

- A visual inspection of the coauthor network of the MIDAS consortium reveals an increasingly collaborative group of researchers.
- However, it also shows there are a few research project grants that have not collaborated with any of the other grants.

Conclusions

- From the graphical depiction of productivity, it is clear that the number of publications doubled after 4½ years (i.e., in 2009) and then again in 3 years (i.e., in 2012).
- It is obvious that the larger U54 Center grants have driven this surge in publications.
- The same grants that lacked collaborations with other MIDAS grants also had fewer publications.

Conclusions

Benefits

- Straightforward to assemble
- Easy to interpret
 - Number of collaborations
 - Who is most collaborative
 - Network evolution

Limitations

- Requires extensive data collection and data cleaning
- Use of specialized tools